TMF

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THE MAC FLYER - For Greater Safety in MAC Air Operations

443d MILITARY AIRLIFT WING, TNG

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The Cottonwood Caper

. . . or how I learned about mountain flying and being prepared.

By TSgt. Elmer R. Leonhardt
118 RMS, Tennessee ANG

The pilot of the V-tailed Bonanza waggled his wings a little as he adjusted his descent onto the gently sloping grass strip. I looked out the window in wide-eyed anticipation, almost holding my breath as I waited for my first-ever dirt strip landing. The relatively smooth touchdown was almost anti-climactic. The sparse grass and hardpacked adobe earth gave a different sound to our landing roll and a thin cloud of dust boiled out behind us; otherwise the landing was quite docile and normal. Dust quickly settled about us as we crawled out of the Beech into the thin crisp air of Moffat, Col., (Elevation 7,553).

The flight from Canon City over the Cottonwood Pass of the Greenhorn Mountains had been a smooth, beautiful flight. The craggy peaks of the Sangre De Christo range glistened in the distance, a stark relief against the cold dark blue sky of November. Mountain flying has always awed me. There is something special about seeing an altimeter read 11,000 ft and still see the mountain peaks towering high above the aircraft. As I watched the Sangre De Christo's getting closer, I saw the beautiful "bridal veils" of snow blowing off the peaks, caused by high winds screaming around the mountains. Many of these peaks are over 14,000 ft and seem to create their own weather.

My brother Larry and his friend Bill, the Beech owner, had flown over the pass to look at an old Aeronca Champ that Larry was interested in restoring. I had bummed along for the ride. As they "oohed" and "aaahhed" over the old "Air Knocker," I looked back apprehensively at the pass we had just flown through. A gray smudge line had developed along the mountains to the northeast of the big valley we were in. I knew just how quickly a storm could develop in these higher elevations in the fall! The temperature was dropping noticeably and even though the sky was still blue overhead, an occasional cold wet snowflake fluttered down. Probably thirty anxious minutes had passed for me when Larry and Bill suddenly became aware of the rapidly worsening weather conditions.

"Oh my gosh!" exclaimed Bill, "we better get back through the pass before it gets socked in." Even as Larry and I crawled in, Bill was warming the Bonanza's engine. A quick checklist was completed while we taxied out.

A loosely hinged door on the old gray weathered barn-turned-hangar waved at us forebodingly in the cold wind as we hurriedly lurched by and launched into a now gray sky. It took some time to circle in the Saquatche Valley to gain altitude to make it over the pass. Bill aimed the nose of the aircraft toward the notch of the pass. It was now overcast, the fat clouds looked pregnant with snow and I knew a snow squall could develop at any time. We glanced anxiously at the walls of the narrow valley we were in. The valley was an offshoot of the Saquatche and was probably several miles wide. The sides seemed closer, and in the softly diffused light, appeared to be a cushiony mat. I knew from experience that they were anything but soft and cushiony. They are rocky, tree-studded and dangerous for man or machine, especially if one were to meet them head on!

Suddenly, to my horror, the storm moved in on us. The whole valley, including the north of the pass we were aiming for, *disappeared*! It began to snow heavily. Snow blew violently against the windscreen and wind buffeted the aircraft, seemingly coming from several directions at once. Keeping

1988 MAC Flight Safety Writing Contest Honorable Mention

his voice calm, Bill said, "I guess we better turn this thing around and get out of here while we still can."

Bill steeply banked the Beech into a sharp right turn and as I tried to visualize how far away the sides of the valley were, we began descending toward Moffat, now far below. As the rugged walls of the south side of the valley came too close for comfort we began to be buffeted by even worse winds. The squall had put us in near blizzard conditions. All cabin chatter ceased and Bill's jaw tightened as he concentrated on keeping the Bonanza straight, level, and away from the sides of the valley that were now uncomfortably close. We finally descended below 9,000 ft and the storm eased considerably. The wind smoothed out and the snowfall slowed to a steady fall. We, once again, saw the hamlet of Moffat off our right wing. We breathed easier as we flew southward. Two major problems still confronted us. How to get home and what to do about fuel.

It is a well known rule that a good mountain flier always leaves home well prepared. That includes not only having emergency provisions and warm clothing on board, but rudimentary tasks, such as topping off the tanks are never missed. Apparently Bill had violated that important rule. We had traveled a considerable distance already. From our home base of Fremont County airport situated eight miles east of Canon City, Colorado, we had flown over Cottonwood Pass to Moffat. From Moffat we had flown back toward the pass before we were run out by the storm; now we had been forced to return to Moffat. I personally didn't know what our fuel status was, but I could tell from the talk up front that it wasn't very good. The second problem was how to get home. We obviously couldn't get over the pass. We also assumed that a northward trek over Pagosa Pass would prove futile. Our only alternative was to fly south to the mouth of the Saquatche Valley, head west to Trinidad, then travel north and west to Canon City.

A quick look at the charts showed no FBO at the nearest town of Walsenberg. As we droned on southward, we were now in clear blue sky. It looked dark and stormy behind us. Eyes continually darted to the fuel gauge and we hoped the storm wouldn't catch up to us, nor would a new one be bred by the mountains ahead. We flew over the Great Sand Dunes National Monument. The huge mounds of bright white sand stood out in stark contrast to the blues and browns of the valley floor. The dunes twisted and rippled like an inland ocean. "At least that sand would have been soft to land on," I thought as the last of the dunes slid by below.

In a few minutes, stately Blanca Peak (Elevation 14,345) came into sight off our left wing. Its lofty slopes towered above us, heavy with snow, some left over from last year. As I gazed upon its majesty I was reminded of a time just two years before when as a Civil Air Patrol observer, I had flown around Blanca in seemingly endless circles searching for a downed civilian air freighter. As I looked at Blanca I shivered with the memory of that episode and wondered if we too would become a mass of twisted metal upon her cold, beautiful slopes.

Suddenly a flash of memory struck! I remembered that our base of operations for that search had been at Alamosa, Colorado, just a few more miles southwest of our location. I eagerly brought this to the attention of the guys up front. Wouldn't you know it? Alamosa was closed for runway repair. Bill confessed that he hadn't checked Alamosa out for a possible alternate anyway. After all, this was supposed to be a short, worry free jaunt, on a clear fall day. Nothing complicated at all!

The topography below was somewhat flatter now, but we still had another smaller range of mountain to surmount. Our pass choices were Cordova (11,248), Cucharas (9,994), or La Veta (9,430). La Veta was a few miles extra, but somewhat lower so we took it. With the aircraft leaning as far as it could, we practically held our breath as we flew on into Trinidad on prayers and fuel fumes. My memory fails me as to how much fuel we took on at Trinidad. I do remember Bill turning pale when he saw the fuel quantity on the register.

We encountered another crisis at the FBO when we realized that we were all lacking in cash. Bill smiled ruefully and pulled out his plastic money. We dug up enough

change to pay for a small snack and lots of coffee. Something we sorely needed after our ordeal. Had it not been for the credit card, we would have had to stay in Trinidad until money could have been wired from home. I couldn't believe the comedy of errors this trip turned out to be.

We collectively sighed in relief as we lifted off the runway at Trinidad and winged our way home. Once again we encountered snow some 30 miles from home. Compared to the blizzard on the Cottonwood it was a piece of cake. Our touchdown and landing roll at Fremont County Municipal was eerily quiet, with the blanket of snow covering the tarmac making a sound dampener. I was sure everyone felt the relief I did that we had survived this ordeal—survived to tell others. As we rolled to the hangar where the Beech lived I glanced westward at the Greenhorn Mountains. They were quickly veiled by heavy snowfall. My legs were wobbly as we stepped from the aircraft. As we leaned into the hard blowing snow, my thoughts went to the near disaster we had just lived through.

The car wipers flip-flopped methodically as they tried in vain to keep up with the heavy wet snow now falling. I settled comfortably into the back of the car and thought of the careless blunders that had caused us to nearly become another statistic. Here is a summary of some of these problems.

Lack of trip planning.

—Had the pilot topped off fuel tanks? Or did we use an unusual amount of fuel because of weather and altitude?

—No alternate flight plan established.

—Charts weren't consulted for possible runway closures or whereabouts of en route FBOs.

—Updated weather should have been obtained prior to departure. A "closer" eye should have been kept on the weather while at destination.

—Adequate funds should have been on hand to handle any trip emergencies. Presence of credit card appeared to have been dumb luck and wasn't planned.

—Unbelievably, there was no survival gear or emergency rations stored on board the aircraft even though we were flying over rugged mountains in late fall.

Trip execution.

—Attempted to make a "panic" run through a mountain pass obviously being ravaged by a winter storm.

—Didn't consider alternatives before departure.

—Didn't land back at original destination point to "regroup" when fuel situation and weather both were bad.

Admittedly the Cottonwood caper was a civilian episode. But everything that happened can be applied to military aviation as well.

Adequate flight planning; professional flight execution; and stringent attention to every small detail, together, make military crewmembers the safe, highly regarded group of flying professionals they are.

I'm not an aviator. But I've spent 20 years working on military aircraft and fueling military aircraft. Because of this I find the matter of safety, both on the ground and in the air, an item of personal interest. I've flown in a lot of military aircraft. Everything from "Klonghopper Airlines" in Thailand, to long haul airlifter flights of thousand of miles across trackless oceans. I've trusted my very life to the guys up front. I'm glad I know that Air Force aircrews are the best in the world. There aren't any "Bills" in the group.

*****

The Tennessee Air National Guard C-130 droned on westward. We were heading for summer camp at Travis AFB, California. I was standing by the aft troop door, gazing out the small window, watching the scenery drift by below, seemingly in slow motion. I began to realize the terrain looked very familiar. I pointed down in excitement as I saw Fremont County Municipal airport below. Canon City drifted by, the telltale slate hillside of the state prison shining bright yellow in the June sunshine. In my memory I traced our path across the foothills steadily westward. I looked down upon the lovely blue/green forrests of the Cottonwood Caper of many years before. I was so glad I was in the capable hands of the professional crew of the C-130 and not flying in the back of Bill's Bonanza in a blizzard.

Prior to joining the TN ANG, TSgt. Elmer R. Leonhardt spent eight years as weapons mechanic in the Air Force. In the "fuels" business for the past 12 years, Sergeant Leonhardt is a full time technician in the Air National Guard.

Human Behavior: The #1 Cause of Accidents

The decision is yours.

Most aircraft accidents are highly preventable. Many of them have one factor in common: They were precipitated by some human failing rather than mechanical malfunction. Pilots who lived through accidents generally knew what had gone wrong. They were often aware of the hazards at the time they elected the "wrong" course of action, but in the interest of expediency, cost saving, self-gratification, or similar irrelevant factors, they nevertheless selected the wrong course of action.

It's a well established fact that our emotional makeup is largely responsible for the accidents we get into. Few of us are mentally ill, but not many of us are perfectly balanced, either. The following list is the result of an international study on accident proneness. If a person fits several of the following, he or she is more likely to be accident prone.

THE BAD ACCIDENT RISK

Definitely Abnormal People Include Those Who Are:

Mentally defective or psychotic.

Extremely unintelligent, unobservant, and unadaptable.

Disorganized, disoriented, or badl disturbed.

Badly integrated or maladjusted.

Distorted in perceptions of life and have a distorted sense of values.

Emotionally unstable and extremistic.

Lacking control—particularly exhibiting uncontrolled aggression.

Anti-social attitudes or possessing criminal tendencies.

Few people belong in the group above but if you keep reading, you will probably recognize someone you know.

People Considered Quite Normal Yet Still Accident-Prone Are:

Selfish, self-centered, or id-directed persons.

Highly competitive people.

Over-confident, self-assertive people.

Irritable and cantankerous people.

People harboring grudges, grievances, and resentment.

Blame-avoidant people always *ready with excuses.*

The *intolerant* and *impatient.*

People with marked *antagonism to* and *resistance against* authority.

Frustrated and discontented people.

Inadequate people with a driving *need to prove themselves.*

Extremely anxious, tension-ridden, and panicky people.

People unduly *sensitive to criticism.*

Helpless and inadequate people constantly in need of guidance or support.

Chronically indecisive people.

People who have difficulty concentrating.

Easily influenced or intimidated people.

Careless and *frivolous* people.

People lacking personal insight and appreciation of their own limitations.

Personalities predisposed to *drink* and *drugs.*

People giving evidence of addiction to alcohol and drugs.

People with suicidal tendencies or who indulge in suicide fantasies.

People exhibiting personality characteristics commonly associated with immaturity, such as foolhardy, irresponsibility, exhibitionism, inability to appreciate the consequences of their actions, hypersensitivity, easily aroused emotionalism, unrealistic goals, and a general lack of self-discipline, personal insight, worldy wisdom, and common sense.

A look at the italicized words reveals many key causes of fatal aircraft accidents. When a tragic accident occurs, people angrily ask why "someone" doesn't do something about the obvious risks certain pilots take.

WELL, SOMEONE HAS!

There are some "do's and don'ts" available to pilots that, by all statistical probabilities, could ensure preventing most accidents. On top of this list

are Federal Aviation Regulations and supporting Advisory Circulars. Born of a lot of know-how and practical experience, they are your checklist for survival. In addition, there are owner's manuals, the Airman's Information Manual, charts, operating limitations, Airworthiness Directives, and many other sources of safe operating procedures published by the FAA and aircraft manufacturers. All this information serves only safety. Not to follow them is like going against your own doctor's or lawyer's advice.

So why do we still break rules?

It's mostly for immediate gratification of some emotional need as the above list of bad risks so clearly points out. It's common knowledge that a lot of things we often indulge in are not good for us (like smoking, speeding, overeating, gambling, etc.). We know this with our intellect but, unfortunately, our lives are too often guided by our emotions and this certainly holds true in aviation. The same personality traits that cause irrational breaches of safety also make a person prone to disregard rules that would ensure a safe operation.

The study also came up with a model of a good accident risk. A look at this list could almost induce one to seek a whole new philosophy of life. According to this study, when you behave as a bad accident risk, you are showing your weaknesses to everyone around you. The "good accident risk" model however, portrays an entirely different person.

THE GOOD ACCIDENT RISK

People considered good accidents risks are:

Well-balanced.
Mature.
Well-controlled.
Have a healthy and realistic outlook.
Satisfactory interpersonal relations.
Kindly and tolerant attitudes toward others.
Well-developed social and civic conscience.
Ingrained sense of responsibility.

Essentially moderate individuals, able to exercise adequate control over their impulses and emotions.

People with positive attitudes able to assess a situation as a whole and make decisions, provided they are not too aggressive.

Contented people who are not outstanding, but who are friendly, cheerful, adaptable, and accepting—providing they are reasonably intelligent, realistic, and mature.

People who have weaknesses and limitations, but are realistically aware of them and are careful, cautious, and moderate in their behavior according to their limitations.

THE DECISION IS YOURS

You need not be a genius to be safe. You merely have to be emotionally stable and accept the notion that you are not in possession of all the facts for all situations and be willing to accept the recommendations of those who specialize in evaluating, assessing, and administering aviation procedures. One can always argue for different ways of doing things. In a large aviation community such as ours, consensus would be extremely difficult to reach. Our rules and procedures are designed to serve most of the people, most of the time. A mature person can accept this gracefully and follow the rules for the benefit of all. The immature, emotionally immoderate person has to satisfy personal needs regardless of the consequences. The student carrying passengers, the non-instrument rated pilot flying into IMC weather, and the local pilot buzzing the neighborhood are prime causes of accidents which often kill innocent bystanders.

It is easier to develop flying skills than good judgment. Good judgment may mean not flying when the weather is marginal (even if it *is* legal), or grounding yourself after taking "over the counter" medication like antihistamines, or getting recurrent training after a long layoff. These are some of the decisions pilots must often make. Unfortunately, many pilots fail to make the proper choice. This is due partly to lack of knowledge and partly to human tendency to rationalize bad news until it becomes justifiable. In simple terms, when we really want to do something we can generally make ourselves believe it's the right way to do it.

We can't make rules for every situation. Some of the decision making is up to you. But you can decide on your personal limitations if you do it at a time when you aren't involved in flying. Limitations to consider are fuel reserves, weather, drinking, fatigue, and others. Write them down. When you have a flight decision to make, re-read them and see whether you have enough character to stick with what you decided when you were conservative and not under emotional pressure to do something foolish.

The most important decision for you to make is to stick with published rules, procedures, and recommendations. They are there for well-proven reasons and can take most hazards out of your flying. If you don't believe that, then you're really kidding yourself.

As a pilot, you hold human lives in your hands. You have a moral responsibility to operate in the safest way possible. If you are a bad accident risk, society would be better off if you didn't fly at all.

Courtesy: *22 AF Safety Crosstell*

VFR in the TCA

A hazardous condition.

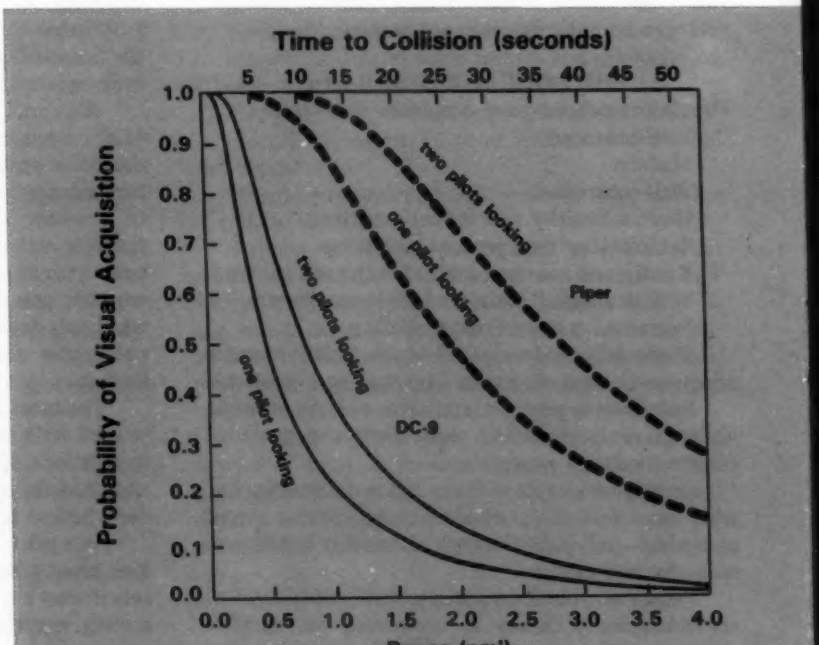
MAC crews seldom, if ever, travel this world on visual flight rules (VFR) flight plans. We do however, encounter other VFR traffic on a daily basis everywhere we fly. Similarly, we pass into, out of, over, under, around and through TCAs on a routine basis. This mishap involves just such a combination-VFR in a TCA.

FLIGHT HISTORY

On 31 August 1986, at about 1141 Pacific Daylight Time (PDT), N4891F, a Piper PA-28-181, departed Torrance, Calif., under VFR for Big Bear, Calif. The Piper's pilot had filed a VFR flight plan with Hawthorne Flight Service Station (FSS). His proposed route of flight was direct Long Beach, Calif., direct Paradise VORTAC, and then direct Big Bear. Proposed altitude was 9,500 feet. The pilot did not (nor was he required to) activate his flight plan. At 1140:36, after being cleared for takeoff, the Piper's pilot told Torrance Tower he was "rolling." That was the Piper's last known radio transmission.

Approximately 20 minutes earlier, at 1120 PDT, Aeromexico Flight 498, a DC-9-32 with 58 passengers and 6 crewmembers on board, departed Tijuana, Mexico, on an instrument flight rules (IFR) flight plan. Flight 498 was a regularly scheduled passenger flight between Mexico City and L.A. International, via Guadalajara, Loreto, and Tijuana. As Flight 498 proceeded towards L.A. International at 10,000 ft, it was handed off to Coast Approach Control, which cleared the flight to Seal Beach VORTAC, then to "cross one zero miles southeast of Seal Beach at and maintain seven thousand (feet)." At 1144:54, Flight 498 reported leaving 10,000 ft and, at 1146:59, was instructed to contact L. A. Approach Control. At 1147:28, Flight 498 contacted Approach Control's Arrival Radar-1 (AR-1) and reported "level" at 7,000 feet. The AR-1 controller cleared Flight 498 to depart Seal Beach on a northwesterly heading for the ILS Runway "Two Five Left final approach course."

At 1150:05, the AR-1 controller requested an airspeed decrease and at 1150:46, advised

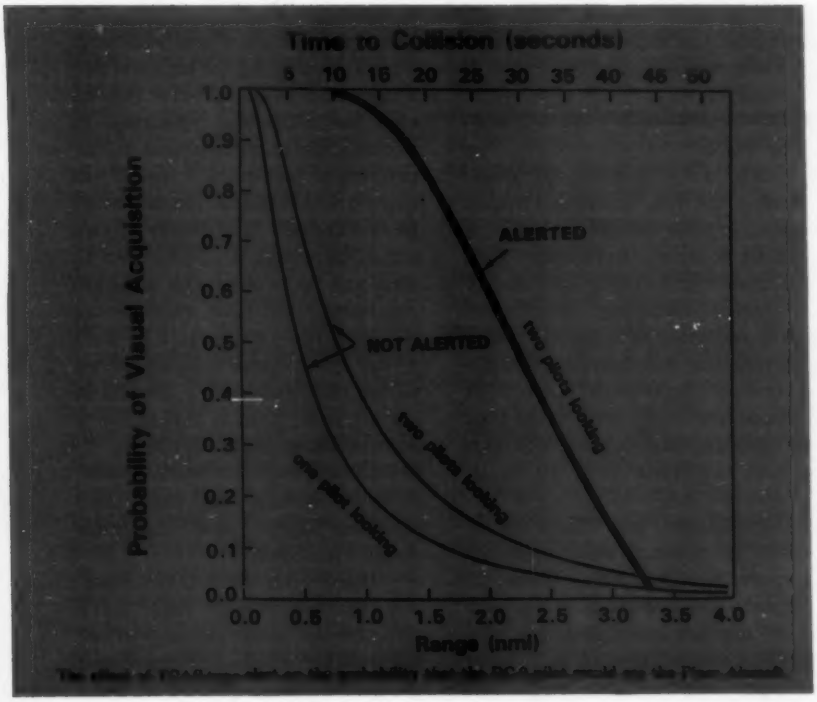

Time to Collision (seconds)
5 10 15 20 25 30 35 40 45 50
Probability of Visual Acquisition
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0
two pilots looking
one pilot looking
Piper
two pilots looking
one pilot looking
DC-9
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Range (nmi)

Probability of seeing the other aircraft as a function of time until collision.

Flight 498 of "traffic, ten o'clock, one mile, northbound, altitude unknown." This radar traffic wasn't the Piper PA-28, but a Grumman Tiger airplane transitting the Terminal Control Area (TCA) at 4,500 feet. The Grumman was a VFR flight from Fullerton to Monterey, Calif., via the Van Nuys, Calif., VORTAC.

At 1151:18, after Flight 498 was cleared to descend to 6,000 ft, the Grumman pilot contacted AR-1 requesting flight following. The controller didn't answer this transmission until 1152:04 because during this period the traffic coordinator had informed him Flight 498 could use Runway 24 Right for landing. At 1152:29 the controller asked the Grumman pilot if he was at 4,500 ft and the pilot answered he was climbing through 3,400 feet. The AR-1 controller admonished the Grumman pilot for being in the middle of the TCA and suggested that "in the future you look at your TCA chart. You just had an aircraft pass right off your left above you at five thousand feet and we run a lot of jets through there right at thirty-five hundred." At this time, the AR-1 controller noticed the computer was no longer tracking Flight 498. After several unsuccessful attempts to contact Flight 498, he notified the Arrival Coordinator he had lost radio contact with the flight.

At about 1152:09, Flight 498 and the Piper collided over Cerritos, Calif., at an altitude of about 6,500 feet. The sky was clear, reported visibility 14 miles, and both airplanes fell within the Cerritos city limits. Fifty-eight passengers and 6 crewmembers on Flight 498 were killed, as were the pilot and 2 passengers on the Piper. Wreckage and post impact fires destroyed five houses and damaged seven others. Fifteen persons on the ground were killed and eight others received minor injuries.



ANALYSIS

The National Transportation Safety Board (NTSB) investigated several aspects of this accident. The board was notified of the accident at 1520 EDT on 31 August 1986. Evidence conclusively showed the collision occurred within the Los Angeles TCA; the Piper pilot entered the TCA without clearance; the AR-1 controller didn't advise Flight 498 of the Piper's position (he testified he didn't see the Piper's radar target); and that neither pilot tried to perform any type of evasive maneuver before collision. Given these data, the major thrust of the Safety Board's analysis was identifying those factors leading to the collision.

ATC Procedures

Procedures contained in the Controller's Handbook require ATC controllers to prioritize the services they provide. First priority is traffic separation service provided IFR airplanes. Training given controllers at the FAA Academy in Oklahoma City and on-the-job facility training emphasize this priority. Thus, except for an aircraft safety alert, a traffic advisory is an additional service provided "workload permitting," and "contingent only upon higher priority duties . . . ."

With regard to the aircraft conflict alert advisory, the handbook limits application of that procedure to situations where the controller is "aware of another aircraft at an altitude which you believe places them in unsafe proximity." The Piper pilot didn't provide any altitude data to the controller and therefore didn't present a condition which required the controller to give this type of advisory. Although the AR-1 Controller said he intended to provide traffic advisories concerning the type of traffic the Piper

". . . the pilot must see the other aircraft in time . . ."

represented, the Safety Board believes the reason he didn't observe its target may have been caused by his attempt to adhere to the priorities and procedures he had been taught.

Additionally, the AR-1 controller's attention was directed toward the area east of L.A. International where traffic was descending to land and the possible conflict existing with the Grumman aircraft. It would appear from his testimony the controller had developed an expectation there was no traffic between Flight 498 and the airport. Consequently, the Safety Board concluded ATC procedures set the stage for the controller to "overlook" or "not see" the Piper's target on his display.

One other factor may have contributed to the AR-1 controller's failure to see the Piper's radar return. During flight inspection on 3 September, the flight inspection airplane's primary target display was unusable for about 30 seconds before the airplane reached the midair collision point. It is therefore possible the Piper airplane's primary radar return was either not displayed or its persistence on the display was compromised during the critical period when the AR-1 controller was adjusting Flight 498's airspeed. Given the configuration of the Los Angeles Terminal Radar Control (TRACON) equipment at the time, if the primary return didn't appear, the only evidence of the Piper's position would have been an alphanumeric triangle, which is much smaller than a VFR aircraft primary return. Since all other VFR aircraft in other areas of the display would have been marked by the larger primary return, it was also possible that the AR-1 controller, not realizing the Piper's primary radar return was no longer being displayed, would have been relying on its presence to mark traffic during his scan.

Given these data, the Safety Board couldn't conclude that the Piper's primary radar return either didn't appear or that its persistence was decreased to the point that it was unusable; however, it also didn't entirely rule out either possibility. Therefore, the Safety Board concluded the TRACON manager's decision to configure the equipment as described may have decreased the prominence of the Piper's radar return thereby causing the controller to "miss" it.

The TCA

The FAA introduced TCAs during the 70s, to reduce midair collision potential after a series of midair collisions involving 12 air carriers. Since 1972, two midair collisions involving air carriers have occurred in terminal areas: the collision over Cerritos, and one over San Diego in 1978. No TCA existed over San Diego at the time of that mishap, so the Cerritos midair was the first to occur within a TCA.

Presently, 23 TCAs exist, each including one primary airport. During 1984, these 23 airports handled about 18 percent of all aircraft operations reported at FAA control towers, and about 64 percent of the enplaned passengers in the U.S. These high density terminal areas contain complex air traffic conditions due to the mix of aircraft present and their wide range of performance characteristics. Under these traffic conditions, separation between aircraft can't be ensured if unauthorized transient aircraft proceed through the area at altitudes used by arriving and departing aircraft. Thus, regulations require authorization from ATC prior to operating an aircraft within a TCA.

A 1986 task force convened by the FAA Administrator submitted 40 recommendations from its studies on TCAs. Adopted recommendations included proposals designed to simplify and standardize lateral and vertical TCA boundaries; proposals designed to enhance enforcement procedures and increase penalties to pilots who intrude into TCA airspace, and a proposal to require aircraft flying within 30 NM of a TCA airport to use Mode C equipment.

Entry of the Piper pilot into the TCA stripped his airplane and Flight 498 of the precise protection the TCA was designed to provide. Its entry into this highly prohibited airspace created an exposure to risk that should never have existed. The Safety Board concluded that if TCAs are to continue to protect the aviation community, the FAA must ensure regulations supporting this protected airspace are well known within that community, and most importantly, that it can and will enforce those regulations.

"See and Avoid" and the TCAS (Traffic Alert and Collision Avoidance System)

The NTSB identified numerous factors which may have affected the pilots' ability to see one another. The board conducted cockpit visibility studies for both

aircraft and concluded both airplanes were within pilots' fields of vision for at least 1 minute and 13 seconds before the collision, but with certain limitations. Based solely on the relative size of the two airplanes, probability of visual acquisition graphs show the Piper pilot had a better chance of seeing the DC-9 than the Aeromexico flightcrew had of seeing the Piper. However, the location of the DC-9, as depicted on the Piper visibility study, showed the DC-9 was visible through the Piper's right windscreen and near the outer limits of a left-scanning pattern. Based solely on the location of the Piper on their airplane's windows and windshields, the Aeromexico flight crew should have had an almost unobstructed view of the Piper PA-28. Of significance was the fact the Piper was approaching the DC-9 from the non-flying pilot's side with less than a 30-degree offset to the left; thus, the Piper was in an area where the Captain's natural scan and attention should have been focused. Factors against these advantages are the Piper's smaller size and the fact it was visible to the First Officer only through the center windshield. In addition, because the airplanes were on a collision course, the relative motion of the Piper would have been minimal and, therefore, more difficult to detect.

Visual acquisition charts generated by the NTSB further illustrated some of the difficulties pilots face in seeing and avoiding other targets. To be effective, the pilot must see the other aircraft in time to initiate and complete an evasive maneuver. FAA suggests that the total time necessary for a pilot to see an object, recognize it as a potential midair target, and execute an evasive maneuver is 2.5 seconds. Charts showing probability of visual acquisition also demonstrated the value of alerting pilots to the presence and location of collision threats.

Between 1955 and 1965, most research in developing airborne collision avoidance systems was conducted by aviation or aviation-related corporations. Each of these corporations produced collision avoidance systems; however, these systems didn't work unless both airplanes had identical equipment of the same technology. About 1974, FAA began a parallel investigation on the possibility of using existing air traffic control transponders as an element in an airborne collision avoidance system. Research and investigation based on the development of a system using the transponder continued and resulted in development of traffic alert and collision avoidance systems (TCAS). These systems were designed to provide reliable aircraft separation, based on time, not distance, from other transponder-equipped aircraft. Various levels of sophistication exist in the systems, however, the basic idea is for an aircraft to interrogate transponders and altitude encoders on aircraft in its vicinity and listen for transponder replies. By computer analysis of these replies, TCAS equipment determines which aircraft present potential collision threats and provides appropriate aural and/or visual display indications with both horizontal and vertical resolution advisories, depending on the equipment's sophistication. The manager of FAA's Airborne Collision Avoidance and Data Systems Branch testified to the NTSB that the FAA had recreated the Cerritos collision geometry to test the TCAS system. During the test, TCAS provided a solid traffic advisory "from a point between thirty and forty seconds to the time of closest approach . . . It (the TCAS alert) would be like the best traffic alert you ever got in your life, plus, it stays on the whole time." On 8 May 1987, FAA stated they intended to initiate a Notice of Proposed Rule Making which, if adopted, would require air carriers be TCAS-equipped.

NTSB studies indicated that had a TCAS alert provided the DC-9 flight crew an avoidance warning on the Piper, the probability of acquisition with both pilots looking would have increased from 30 to 95 percent. In conclusion, the Safety Board recommended TCAS development to augment the "see and avoid" concept to lessen the risk and possibly eliminate midair collisions near major air traffic hubs.

Probable Cause

The National Transportation Safety Board determined the probable cause of this accident was the limitation of the air traffic control system to provide collision protection, through both air traffic control procedures and automated redundancy. Factors contributing to the accident were (1) inadvertent and unauthorized entry of the PA-28 into the Los Angeles Terminal Control Area and (2) limitations of the "see and avoid" concept to ensure traffic separation under conditions of the conflict.

Application to MAC

Factors contributing to this accident have a direct application to the way we conduct our daily operations. "See and Avoid" is a fact of life in the flying game, and the TCA is no place to let down your guard. No, we don't routinely transit TCAs under VFR, (except for you weekend aviators in your puddle jumpers) but lots of other folks do. The bottom line is keep your eyes open and don't assume the controller has the "Big Picture" on his scope. As they say, the life you save may be your own.

★

Adapted From: *NTSB/AAR-87/07*

Who Killed MacMillan?

Accident board members picked up the pieces and carefully investigated the Globemaster crash. But not until then did anyone dare respond to the nagging question left unanswered ten years ago.

By Maj. David M. H. Sibbald
436 MAW/SEF
Dover AFB, Del.

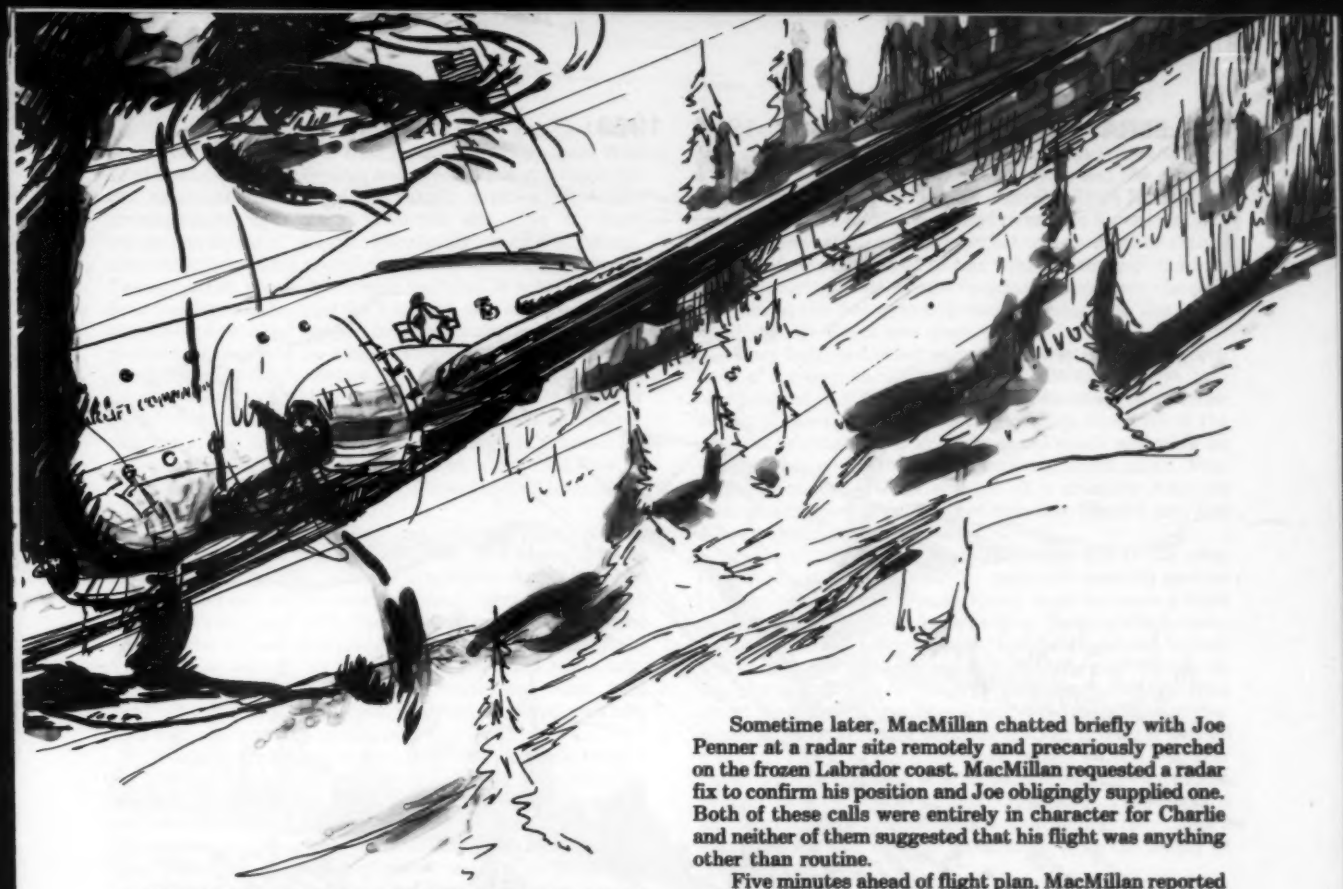
(July 1975)

Charlie MacMillan's dead. That's a fact, final and irrevocable. Such parts of him as were recovered were minutely examined by a skilled pathologist who declared these meager scraps of flesh were indeed the last mortal remains of Charlie MacMillan, Captain, USAF.

How MacMillan died is also known; the spectacular manner in which Charlie plastered his lumbering Globemaster up the side of the Sondestrom Fjord has been rather cleverly reconstructed by a skilled team of Air Force safety types. But one rather odd and interesting fact remains. Although they know where, how, and when MacMillan died, the United States Air Force, in all its wisdom, doesn't know *why* MacMillan died. In an accident report several inches thick, the investigating team explained at some length and in great detail that they could find no positive reason for Charlie's untimely and exceedingly violent end.

Almost ten years have passed since that disastrous November night and still I see no one putting pen to paper about Charlie MacMillan and the circumstances surrounding his death. It's time someone did; certainly there's plenty to tell. So many of us knew so much more than we ever told the investigators. As one of the active . . . passive? . . . both? . . . participants in events which led up to the crash, I think it's time to get it all down, in order and logically. Maybe it'll make more sense now than it did then. And maybe I'll sleep better at night.

Just before his takeoff from the States back in '65, Charlie MacMillan stood hard upon his brakes at the end of the runway. He called for the checklist and his flight engineer started the ritual examination of the four rumbling powerplants. It was no night to be going anywhere, but it was a particularly rotten night to be taking off for Greenland. The airfield outside Charlie's cockpit was drifted deep in snow, and a steady northeast wind of some 20 knots swirled the still-falling flakes against the heated glass windshield. Two large yellow snowplows, marked by flashing blue and yellow beacons, snorted up and down the runway. Obligingly they'd pull off to the side when Charlie announced his readiness for takeoff. Charlie didn't care if he never got ready.



His schedule called for a refueling stop at Goose Bay, then a fairly short leg on into Sondrestrom. The cavernous cabin of his Globemaster was crammed with fresh vegetables, eggs, and Christmas mail. Charlie was in an extremely ill humor. After all, a midnight departure for Greenland on a miserable winter's night is no fun for anyone. For a scheduling officer who had a reputation to maintain as a Grabber-of-Only-the-Good-Trips, it is downright embarrassing. However, when the scheduled aircraft commander had suddenly called in sick, Charlie was the only rested AC available. So there he was, about to roar into the black November sky, when he'd much rather have been at his own fireside sipping a Jack Daniels and studying the *Wall Street Journal.*

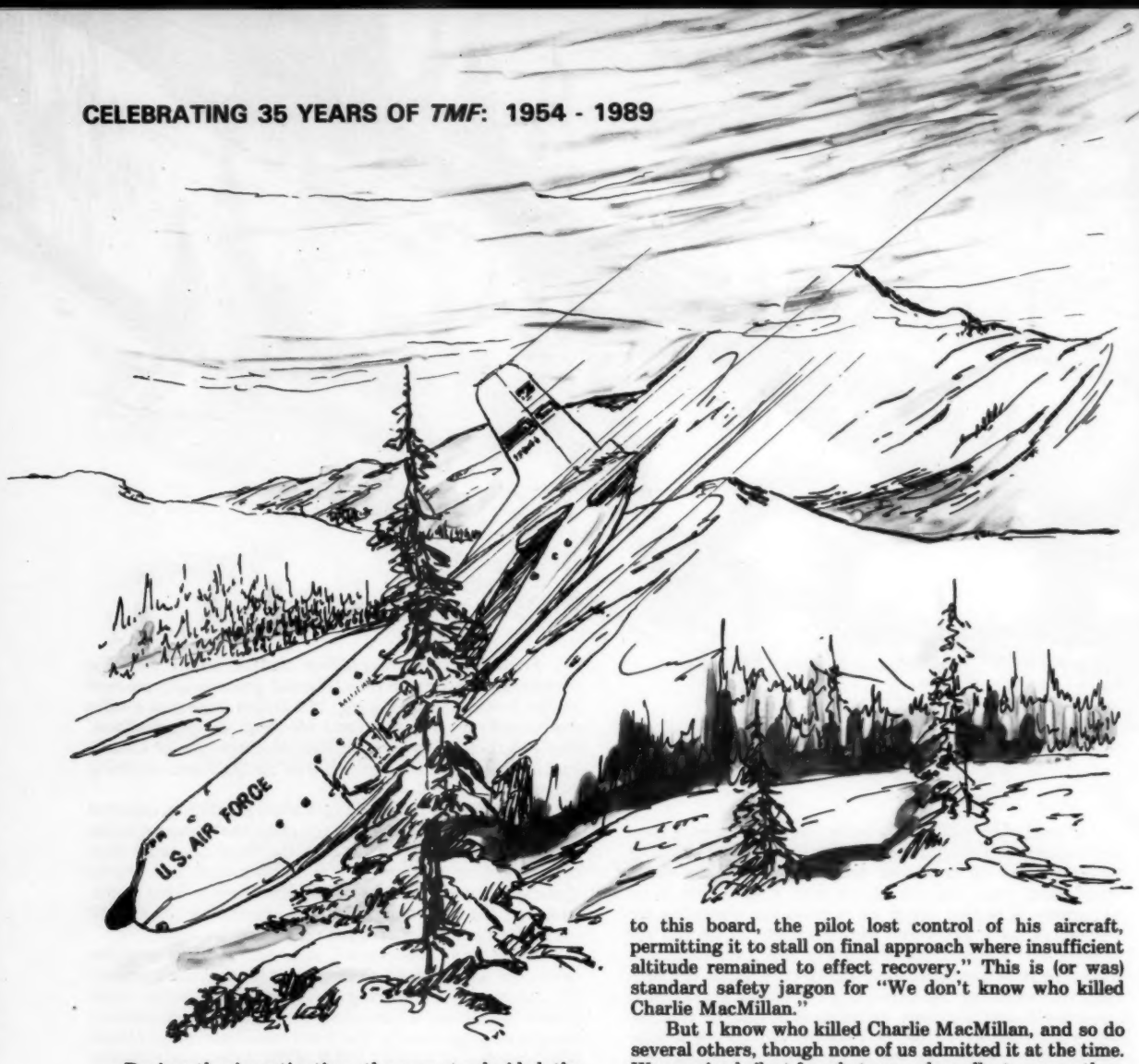
The flight to Goose Bay was uneventful. There was some moderate icing at the cruising altitude of 9,000 ft but, passing Boston the Globemaster broke into the clear and droned on to Goose Bay where it landed on a snow-covered runway under clear, cold skies. While his machine was being refueled, Charlie MacMillan and his crew had a hot meal in the terminal snack bar. Their departure from Goose and their flight to the coast of Greenland were also uneventful. Droning north over the frozen Davis Straits, MacMillan exchanged a few words with TWA 609, inbound on a great circle from London. The TWA captain later testified that Charlie had inquired about the beauty of the hostesses aboard the jetliner. TWA 609 being a freighter, there were no stewardesses aboard and the captain asked Charlie about the weather between their present position and Boston. Charlie obliged and the two craft went their separate ways.

Sometime later, MacMillan chatted briefly with Joe Penner at a radar site remotely and precariously perched on the frozen Labrador coast. MacMillan requested a radar fix to confirm his position and Joe obligingly supplied one. Both of these calls were entirely in character for Charlie and neither of them suggested that his flight was anything other than routine.

Five minutes ahead of flight plan, MacMillan reported over Holsteinborg NDB, located close to the mouth of the Sondrestrom Fjord. In summer the fjord murmurs with sparkling blue water which, 90 miles inland, laps gently against the end of the Sondrestrom runway. That night, however, the deep blue water was covered by thick black ice and a light snow was falling on Sondrestrom.

MacMillan made contact with the Sondrestrom radar controller and received clearance for his approach. He left his cruising altitude and began responding to vectors which should have brought him safely to the end of Sondrestrom's steeply sloping runway. The fjord was obscured by clouds which reached to within 1,500 ft of the surface and visibility was three miles through a gently falling snow. The captain of a Scandinavian DC-8, which landed a few minutes before Charlie's crash, reported there was no turbulence or ice and that it had been a smooth, routine approach.

During the investigation, the radar operator testified that MacMillan's heading and glide path control had been "erratic" although "no worse than some others" he'd seen. He then testified that when the aircraft reached a point about seven miles from touchdown, it drifted rapidly left of course, corrected back to the right, climbed high above the glide slope, dove through it, and disappeared from the scope. The only answer to his subsequent urgent calls was the soft hiss of static in his receiver. His shift supervisor, leaping for the door of the red and white-checkered radar van, was just in time to see a huge flash of fire and a billowing explosion from the north shore road. The rescuers arrived at the crash site to find the torn remains of a Douglas Globemaster burning furiously. There were no survivors.



During the investigation, the experts decided the machine impacted nose low with the wings almost level. They also discovered that all four engines had been bellowing their maximum power at impact. As they progressed, they also found evidence that the flight instruments and their power source had been operating normally. So why then did MacMillan crash? Why did Charlie MacMillan and five others end their flight and their various hopes and aspirations against the frozen wall of the Sondrestrom Fjord?

The crew was current and qualified. They were current even to the point of everyone's having had a recent oxygen mask inspection, a fairly rare situation in those days before MAC bought the sweep-on mask. Examination of body tissues showed no evidence of alcohol or other poisons. So what happened? Who or what killed MacMillan? Why did a qualified, experienced crew, in a well-maintained, smoothly running airplane stall, crash and burn during a routine instrument approach? The final verdict of the investigators was not enlightening. "For reasons unknown to this board, the pilot lost control of his aircraft, permitting it to stall on final approach where insufficient altitude remained to effect recovery." This is (or was) standard safety jargon for "We don't know who killed Charlie MacMillan."

But I know who killed Charlie MacMillan, and so do several others, though none of us admitted it at the time. We remained silent for what seemed excellent reasons then. Where's the man willing to stand up and accuse the squadron commander or the chief of standardization? Remember, this was '65—a different time and place from '75. Who would let a board of strangers know about MacMillan's actual level of competence and who would tell the truth about his copilot? No one would. But now it's time. MacMillan's death illustrates so vividly and with painful clarity how a unit or a crew may look on paper and yet be seriously deficient in their flying ability. Let me tell you how MacMillan's outfit was, ten years ago.

The squadron commander was probably the weakest link in a rusty chain that finally parted the night MacMillan died. The man had never commanded a flying unit before and was badly out of his depth. It was rumored, and with some accuracy, that he was the only man in his class who had not made full colonel and that this assignment would do the trick. He was not a particularly good pilot and did not care to fly. He was therefore very poor at making the proper decisions for a flying unit. His lack of experience

and lack of confidence caused him to place great reliance upon his squadron staff. And a couple of them used this situation to further their own ends. He seldom went against the recommendations of his staff, even when these recommendations were ill thought out. One of these recommendations, which eventually became policy, concerned the scheduling of staff pilots on flying missions. The squadron hierarchy, which included MacMillan, had first choice of all the trips the squadron was assigned. Since these people worked so hard in administrative jobs, it was thought they ought to have preference when it came to choosing trips. The problem was, of course, that the staff pilots abused this policy and the commander permitted them to do so. The exciting, exotic missions to Kenya, Australia, and South America were invariably grabbed by the wheels, while the great unwashed of the unit flew to Germany, the Azores, and Greenland, Greenland, Greenland.

One of the outgrowths of this policy, if policy it may be called, was that MacMillan seldom flew where the bad weather was. One thing Charlie MacMillan dearly loved to do was stay out of bad weather. And rightly so, because he wasn't very good at it. One evening in the bar, a young copilot who'd flown several trips with Charlie sounded off.

"Better watch you don't fly into a cloud some day, MacMillan. You'll probably spin, crash, and burn, heh, heh!" But it was Happy Hour, so we all chuckled with him and thought no more about it.

Though MacMillan seldom flew solely by reference to his flight instruments, his Form 5 showed otherwise. On his frequent trips to Honolulu and points west, he logged lots of weather time and numerous instrument approaches. Looking back, I wonder why none of us ever called him on this. You don't consistently see 60 hours of weather time on a 90-hour mission to Saigon or Clark. Looking back again it's not hard to see that in spite of the impressive columns in his Form 5, Charlie MacMillan's instrument technique was probably chronically rusty.

In addition, MacMillan was just naturally loose. He flew the same number of checkrides as everyone else and he usually passed. But he never made a good enough showing to have anyone recommend him for instructor pilot. His grades from block training (I think we called it annual refresher, back then) were always just barely passing. A curious thing since he flew the same aircraft, attended the same course, and answered the same questions year after year. The only time I ever saw MacMillan read the CIF or Dash One was immediately before a trip when he'd zip into the crew reading room and initial everything in sight. He was also an accomplished square-filler and usually dodged flight safety meetings, 5BX (Aerobics), flu shots, and anything else he didn't personally approve of. Control of those items ten years ago was just loose enough that MacMillan could usually get away with it. It is interesting and undoubdetly coincidental that MacMillan skipped the monthly flight safety meeting the day before he crashed. It was on cold weather procedures.

Of course the fact that he was an undisciplined and unprofessional pilot who happened to be a bit rusty on instruments didn't kill MacMillan. After all, he flew instruments well enough to pass his checkrides, so he should have been able to handle a routine radar approach to Sondrestrom. It took just a few more factors to do him in.

MacMillan had with him on this last trip a copilot by the name of Minkiewicz. They had been aviation cadets together around the time of Korea, and they had a lot in common. They were both marginal pilots and they were both attitude cases. Minkiewicz had recently returned from a staff job and his flying was so rusty he had the devil of a time just checking out as a second pilot. Both MacMillan and Minkiewicz had been passed over once for major, and they were sweating out the next list to be published within the month. Each seemed to find some measure of comfort in the other's presence, and frequently you'd see the pair of them in the bar growling and bitching over the lousy hand the Air Force had dealt them.

They both had other personal problems. At any given hour of the day, should you pass MacMillan's house, you could almost count upon seeing Mrs. Mac staggering under a load of martinis or recovering from an overdose of the same. MacMillan never knew what she would pull while he was off flying and she was constantly on his mind. Mrs. Minkiewicz was a frail shadow of a creature who, we discovered, was quietly dying of leukemia. She did, too, just a few months after the crash.

So now we've got MacMillan and his C-124 over Holsteinborg facing a weather approach into the narrow confines of the Sondrestrom Fjord. And we know a little more about him than we knew before. Charlie's a little rusty on the needle-ball-airspeed act. His copilot is worse; he may not even have the sense to keep the blue part on top on the attitude indicator. Both of them have their worries about promotions, passovers, and their respective wives. Some final little distraction was thrown in, and it was all a bit too much. Some final straw which no one will ever identify caused Charlie MacMillan and Minkiewicz to lose control of their ship on final approach. There was a shuddering stall which ended in a sickening dive, then a blazing holocaust a scant three miles from the safety of Sondrestrom.

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Not long after MacMillan's death I was promoted to colonel and reassigned to a staff slot in the Pentagon. I was ready to leave. Commanding an operational flying squadron had not been my cup of tea. The day I made the CO's official visit to MacMillan's wife and all the other wives was one of the worst days of my life. It was some months after I had left before I began to see that had I been a commander in the real sense of the word, MacMillan's accident would never have happened. I could have insisted he and the other staff pilots take their fair share of the not-so-pleasant missions. I could have closely reviewed his checkrides instead of automatically endorsing them. I could have held him down for training or I could have had him in and laid down the law. I could have taken any number of steps, any one of which might have saved him. After all, that's what commanders are for. The commander is responsible for the safe and efficient operation of his unit and that doesn't include letting marginal aircrews kill themselves. How simple it is now; how obscure it seemed then.

It's been almost ten years and I am long retired. My life is golf, fishing, and the beach. Yet still, sometimes in the dark of the night, I wake up shuddering and sweating because once again in my mind's eye I've watched a C-124 come thundering out of snow-filled clouds and explode against the ice and rocks that rim the Sondrestrom Fjord. Sleep is often hours returning and sometimes never comes because I was no leader, or commander and, in the final analysis, I killed MacMillan.

443d Headquarters

Painted lines on the taxiway out of parking reinforce a student's judgment on taxi distances. The four lanes represent 10 and 25 ft from a wing tip for both the C-141 and C-5.

The Airlift Training Center Campus.

No question of right-of-way.

The 443d Military Airlift Wing

Planting a seed of safe mission accomplishment.

By Capt. Dan Dougherty
Associate Editor

Every noteworthy profession has a seat of learning, a fountain of knowledge, if you will. You'll find one of these seats of learning in a remote corner of southwestern Oklahoma. Altus Air Force Base is the uncontested "Strategic Airlift University." This MAC formal school offers graduate and doctoral degrees to aircrew members operating C-5 and C-141 aircraft throughout the worldwide airlift system.

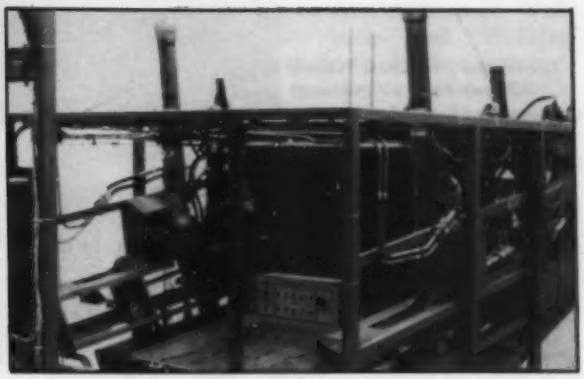
But the instructors and cadre of this unique school do much, much more than teach "Step B follows Step A." In the words of Lt. Col. John Liegl, 443d Chief of Safety, "Safe mission accomplishment is taught in theory, practice, and by example."

Their mission is broad in scope: Conduct *all* formal C-141 and C-5 qualification training for officer and enlisted aircrew members; manage Department of Defense Basic Flight Engineer School; and accomplish "other special tasks as assigned by higher headquarters."

Not a small task to accomplish with about 3,000 students graduating yearly, from 31 different courses. Their location greatly complements their mission. By coastal standards, the weather here is exceptional, with an average of only 12 days a year when ceilings drop below 3,000 ft and visibility is less than 3 miles. Furthermore, air traffic density is extremely low. Considering similar traffic pattern speeds of home station aircraft, the sky practically "belongs" to Altus. Finally, the open spaces of Oklahoma's Great Plains Country allows for expansion. And expand it will, as future C-17 aircrews will also attend "Altus U." Actually, its real name is Airlift Training Center.

The heart of the Airlift Training Center is a $13.1 million, multibuilding complex opened in January 1987. In addition to training MAC aircrews, the Center operates the DOD Flight Engineer Course,

Highly detailed KC-135 model rides a rail in front of the camera in the Air Refueling Simulator.



C-5 Loadmaster Panel Procedures Trainers

Preparing for every possibility, the wing's safety office joined the base fire department in recreating a recent C-5 fire mishap.

training Air Force Reserve, Air National Guard, and Navy people in addition to international students from 11 allied nations.

There are 50 classrooms in the huge, three-story academic building. The Cockpit Procedures Training Building houses two C-141 and two C-5 procedures trainers. A *very* spacious Flight Simulator Facility is where you'll find one KC-135, two C-5, and three C-141 flight simulators. Additionally, the new air refueling simulator is housed in this building. The first simulator of its kind, this single trainer can simulate flying either a C-141 or C-5 behind either a KC-10 or KC-135. (See Side Box)

Moving well beyond basic qualification courses, Altus trains C-141 pilots, navigators, and loadmasters in aerial delivery systems for combat, worldwide airlift, and humanitarian mission support. Crews practice equipment airdrops on nearby drop zones, while personnel drops are done at Fort Benning, Georgia. This hardly completes the list of what Altus does—they also conduct initial chemical warfare equipment training, and recently began teaching Combat Aircrew Training.

This latter course is classroom intensive and teaches all areas of mission planning. Detailed route planning is centered around enemy anti-aircraft systems capabilities where students learn to develop lifesaving terrain masking and avoidance techniques. Aircraft commander students spend a day preparing an "approved" solution route, then fly it the following day. Additionally, students are now being taught threat avoidance arrival and departure procedures that quite honestly "look," to the casual observer on the ground, like an airlift airshow.

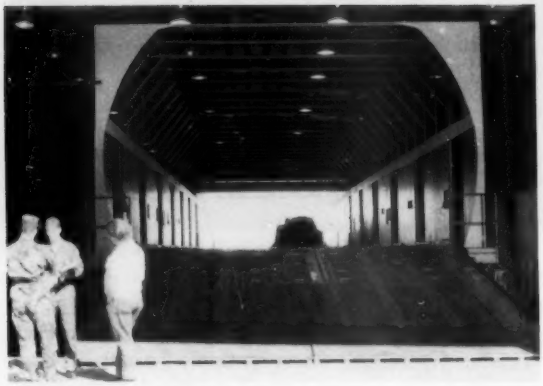
Altus U. is geared around airlift pilot professional flying career development. Initial qualification training is just a first trip to Oklahoma. A pilot can expect to return for aircraft commander upgrade, aerial delivery, and air refueling qualification and, finally, instructor upgrade training. With so much to do, this school is ideally located to perform its mission.

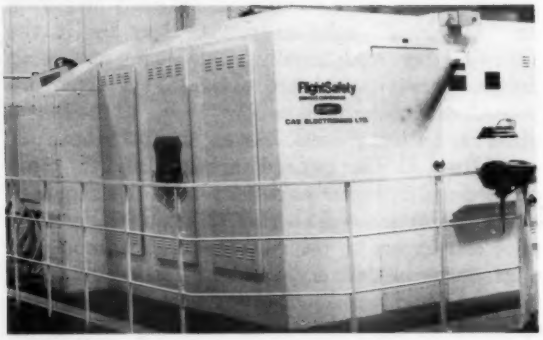
While some may express displeasure about the base's isolation—that's exactly what makes it perfect. Altus is a school of learning, it encourages focused attention on the subject at hand, and does so with an exceptional measure of standardization. Altus can offer the serious airlift student what no in-unit training program can match: Continuity of training; modern, sophisticated procedure trainers and simulators; and motivated, professional instructors sincerely dedicated to providing their students tools to safely accomplish MAC's strategic airlift mission.

Assigned instructors are truly the best of the best. Their commitment goes well beyond thorough subject matter expertise. Most importantly, they recognize the impact of their contributions to MAC's future. Altus instructors know their actions are copied and their individual pride goes far beyond

Loadmaster Procedural Trainer; full scale cargo compartment mockups used for loading training.

C-141 Simulators





C-5 Simulator

their own performance, as they gladly do whatever is necessary to live up to, and maintain, the 443d's reputation.

This reputation cannot be overlooked. All Altus instructors attended Altus as students, flew the line, and returned. They know the importance of following the book, building a solid foundation, and advocating standardization. Most importantly, Altus instructors believe safety and mission accomplishment are inseparable.

From the wing commander to line instructors, Altus strives to go beyond simply imparting information. Their goal is to instill an attitude. Evidence of their progress abounds. The motto on the Airlift Training Center brochure, handed to incoming students checking into billeting, says it first, "Safety Through Knowledge." The initial student orientation safety briefing goes well beyond the mandatory "farm vehicle hazards on the highway," and "rattlesnakes abound" subjects by going deeply into MAC's recent mishap history. Each tragic event is explained in a way to help students gain their first understanding of terms like human factors, complacency, and aircrew coordination.

From the beginning, Altus sets a tone, a permeating theme running through every course, every procedural trainer, well into the simulator, and later to the flight deck. The 443d steps up to their responsibility to not only train aircrews to operate complex systems, but to accomplish missions.

Altus instructors are constantly exposed to the most hazardous environment in the flying profession. Low altitude pattern flying, multiple takeoffs and landings, simulated emergencies, aerial delivery, and air refueling. All these combine to keep this school's mission on the "razor's edge" of potential disaster. Furthermore, they walk this tightrope carrying a student. The tone and quality of training *must* be of a quality that meshes well with exceptional teamwork and aircrew coordination between various crew positions.

This doesn't happen by accident. At the conclusion of the wing safety officer's orientation briefing, they show a slide with a quotation that captures the "Altus Attitude" towards flight safety: "A well-trained crew, in a well-prepared aircraft, working together, by the book, is the best flight safety program you can have."

Maj. Don Black and Capt. Randy Fullhart, wing flight safety officers, can readily add to their quoted wisdom. Absence of any of those four requirements markedly increases chance of a mishap. Furthermore, Altus proudly steps up to their responsibility and lives by their motto!

The student's next step, and the first phase of training, is the responsibility of the 443d Technical Training Squadron. According to the commander, Lt. Col. Joe Henderson, in addition to teaching procedures, they emphasize crew coordination and communications—to develop what he calls a "trust factor." Colonel Henderson went on to say, "Throughout the building-block learning process,

classroom, to simulator, to flight deck, stabilizing the situation and maintaining aircraft control come first."

Lt. Col. Marty Amelong, 57 MAS Commander, (C-141), carries the Altus theme forward during his initial inprocessing briefing to students when they arrive at the flight line. Colonel Amelong stresses the fact that "safety," *per se*, is *not* a separate department. It's woven into any discussion about flying. He also devotes particular attention to enlisted aircrew members, who, in many cases, are about to embark on their first flight mission. His message is about aircrew coordination, and in a stern warning he tells them, "They have a *right* and an *obligation* to speak up whenever anything doesn't appear right."

From everyone I spoke with, the phrases, 'Well-trained crew," "By the book," and "Working together," were driving goals. Each supervisor, instructor, or cadre member of this "Airlift University" was not only a particular subject matter "expert," but also committed to planting that seed of safe mission accomplishment.

"After all," as one instructor said, "Whenever you look to the sky at either a Starlifter or Galaxy, there's a little bit of Altus there." ★

The 443d MAW—Tradition in War and Training.

The 443d MAW's roots can be traced through a distinguished lineage of two units. The 443d Troop Carrier Group was activated in October 1943 and operated in the China-Burma theater flying venerable C-47s and, occasionally, towed gliders. 1943 was also noteworthy, as it was in that year Altus AFB opened as a Flight Training School under command of the 63d Troop Carrier Group (Yes, the birthright unit of Norton's fame).

Deactivated after the war, the distinguished 443d was reactivated once more in 1947, this time as a Troop Carrier Wing (Reserve). Back in action, the wing supported United Nations Forces during the Korean Conflict, from July to December 1950. This was the beginning and, during this period, many wing members were called to active duty.

The following month, January 1951, the wing was alerted to active service. That April, they began flying C-46s and continued to do so until again deactivated in February 1953.

In September 1951, another distinguished unit was activated at West Palm Beach, Florida. The 1707th Transport Wing, Heavy (Training), conducted standardized aircrew training for the Military Air Transport Service (MAC's birthright). The 1707th moved to Tinker AFB, Oklahoma, in 1959.

In 1965, the 443d came back, this time as a Military Airlift Wing. Activated at Tinker, the wing absorbed 1707th resources and in 1968, moved to Altus.

The first class of C-141 pilots graduated in May 1969. In December of that same year, the first C-5 was delivered. This year marks the wing's 20th anniversary as MAC's Airlift Training Center.

The New Refueling Simulator

In February, a "first of its kind" simulator took its position next to six other simulators in Altus AFB's Airlift Training Center. The trainer will simulate flying either the C-5 or C-141 behind the KC-10 or KC-135.

It has very high fidelity visual, tactical, aerial, and aerodynamic performance characteristics. Being the only visual system in existence offering actual three dimensional presentations, the new AR simulator employs innovative optics to create near real simulation.

Calling this a "box" is quite a misnomer—50 by 44 ft at the base, it stands 36 ft tall. There is a flight deck that sort of crosses between the C-5 and C-141. But with the lights down, and the computer programmed for the right airplane, there'll be little confusion. Aircraft noise and a vibrating seat top off the amenities making the flight deck as close to authentic as required.

It's the studio that's impressive; a large, very detailed model of either the KC-135 or KC-10 rides a rail that moves it all around the stationary camera filming the sequence the student watches through his windshield.

The new trainer has the capability of simulating day, dusk, or night in various visibility conditions; a full range of turbulence, and a variety of both airlifter and tanker gross weights.

(Source: *The Galaxy*: 24 Feb 89)

QUICKSTOPPERS

RESULTS OF MILITARY COURTS

(October 1970)

Reference No. 43 Brief - October 1917 Summary

Major W. de kitkat-Watney's Nieuport Scout was extensively damaged when it failed to become airborne.

The original Court of Inquiry found that the primary cause of the accident was carelessness and poor airmanship on the part of a very experienced pilot.

The Commandant General, however, not being wholly convinced that Major W. de kitkat-Watney could be guilty of so culpable a mistake, ordered the Court reconvened.

After extensive inquiries and lengthy discussions with the Meteorological Officer and Royal Astronomer, the Court came to the conclusion that the pilot unfortunately was authorized to fly his aircraft on a day when there was absolutely no lift in the air and could not be held responsible for the accident.

We extend our congratulations to Major W. de kitkat-Watney on his reprieve and also on his engagement to the Commandant General's daughter, which was announced shortly before the accident.

EYES

(January 1971)

A man with only fair vision who knows the rules for good seeing is far better off than the man with superior eyesight who doesn't know how to take a good look.

GLOWING GLUTEI

(April 1985)

A tire failure initiated a high-speed rejected takeoff for the crew of this unfortunate 747. Stopping on the "reef runway" at Hickam's international airport, the crew discovered a large fuel leak, the result of tire shreds shattering an access panel below the Number 3 main fuel tank. Accordingly, the captain ordered an evacuation. But with 396 passengers, 10 flight attendants, and 3 crewmembers aboard, the evacuation was a major effort, not without its difficulties.

The flight crew emerged unscathed, but three passengers were seriously injured, one as a result of escape slide failure, the other two as a result of escape slide use. Other passengers suffered minor injuries from their trips down the slides as well, but the injuries weren't necessarily from unfamiliarity with the slide.

The female flight attendants were knowledgeable on escape slide procedures, yet all ten were injured during the escape. Seems they were all dressed for the weather instead of safety. As they exited the aircraft via the slides, their loosely fitted muu-muu skirts slipped above their hips, and they each suffered friction burns to their gluteal epithelium.

Because of their "vulnerable attire," some flight attendants have begun wearing bermuda shorts beneath their muu-muus.

CELEBRATING 35 YEARS OF *TMF*: 1954 - 1989

Up and Locked

A potentially painful position.

(Director's Comments: You should all by now be familiar with the words "human factors." Unfortunately, you usually hear these words immediately following a fatal mishap. As we prepare this issue of *TMF*, the Military Airlift Command has three mishap boards investigating three separate aircraft mishaps, each with multiple fatalities and a destroyed aircraft. But, we also have mishaps that don't kill or maim, and don't destroy airplanes. Here are three examples of humans flying airplanes. Pick out the human factors involved and recall how much of your flight is spent "asleep at the wheel." We realize crewmembers involved in these incidents will recognize themselves and may be uncomfortable. We also realize that every single one of us is vulnerable to similar errors and could have gotten into similar situations.)

"Hey Mac, how you doin'?" asked Capt. Jack Riley as he walked into Mac's office.

"Lousy. Whatd'ya want, Jack?"

"Aw, c'mon. Things can't be that bad. Whatever happened to 'Mister Optimism'?"

"Well, things probably aren't that bad, but things *are* beginning to look like what that little girl said in that horror movie—*they're baaaaaaack*."

"What the heck are you talking about, Mac?"

"Them. Good people doing spooky things. Crewmembers flying around with their heads

fixed in strange positions."

"What positions?"

"Up and locked! You get the idea?"

"Not quite. I'll bite. What's going on?"

"I've been reading about the stuff some folks in the field have been up to. It's enough to make you wonder if anybody's awake out there. Help yourself to some coffee, Jack. It's fresh and this'll be a long tale of woe."

"Shoot," said Jack, blowing on a cup of fresh and hot.

"Well, the first is a heavy-lift helicopter crew. They prepared for a pretty complicated training mission. It was a night vision goggle, dual hose air refueling training mission with the copilot and jumpseat flight engineer receiving training on a new navigation system. They briefed with the HC-130 crew, but the -130 developed a problem so the chopper took off for some local area work. The crew performed four traffic patterns with the gear down at the adjacent LZ, then were informed the -130 wouldn't make it. They then decided to continue with the low level portion of the mission to another LZ. They retracted the gear and flew the 30-minute route. The engineer appeared to be having difficulty operating the nav system.

"When they neared the second LZ, the IP called for, let's see here, the "Alternate Insertion/Extraction Briefing' and "Gear Down, Before Landing Checklist." The IP deliberately flew a wide pattern to allow for checklist completion. But here's where it all started. Although the flight engineer called the checklist complete, *he never actually lowered the gear handle*!"

"Well, I guess that happens," Jack interjected.

"Wait, the story isn't over yet. The IP flew the first pattern to a simulated fast rope deployment, using a 50-foot hover. They flew the next pattern using the Traffic Pattern Checklist to another 50-foot hover fast rope deployment, followed by a landing from a hover to deploy an infrared strobe. The engineer *again* called the checklist complete. Remember, he never lowered the gear. They landed on the wet, somewhat marshy LZ, which was covered by 12 to 18-inch high grass.

"The right scanner jumped out and noticed the aircraft sitting a little low, but just thought the gear was in the mud. They took off again, with the copilot flying two approaches to simulated fast rope deployments. They used the Traffic Pattern Checklist, which was called complete by the FE on both approaches. They then landed to pick up the strobe, *again* with the gear up. The scanners again thought the aircraft was sitting a little low. The right scanner got out again to retrieve the strobe and, even with his goggles up and using a flashlight, still didn't notice the gear wasn't down."

"Aw, c'mon!"

"Now hush, Jack. I'm not finished yet. The scanners discovered the nose IR spotlight cracked and the crew decided to RTB to get it looked at. After takeoff, the IP called 'Gear up, After Takeoff Checklist.' Nobody noticed the gear handle already in the up position. Approaching the base, the IP ordered the crew to come off NVGs, and reminded the copilot, who was flying the helo, to call for a 'Before Landing Checklist' before turning base.

"The IP assumed aircraft control on base leg and performed a running landing. Later, he couldn't remember a call announcing the Before Landing Checklist complete. The tower tried to help with a 'check wheels down' call, but the crew just replied with their call sign. The IP continued the approach to touchdown, when the scanners saw sparks and called for a climb."

"They sure blew it, didn't they?"

"*They* is the right word, Jack. The entire crew relied on one person, the flight engineer, to extend and confirm the gear was down. At no time during any landing sequence did the pilot or copilot check gear position. The crew wasn't aware of a recent checklist change requiring one pilot to also check gear position. They knew the FE was having trouble operating the navigation system and should have monitored his actions more closely. There was also an instructor FE on board; what was he watching? He also should have caught the mistake.

"The flight engineer also caused his own problem. He didn't lower the gear when called for in the Dash One. His technique, or should I say method, after a 'gear down' call by the pilot, was to begin reading the checklist and delay lowering the gear until step 8 of the Before Landing Checklist, which reads 'Gear Checked.' While flying the traffic patterns, he assumed the gear was down because it was supposed to be. They landed gear up *three times*."

"Now wait a minute, Mac. Don't those helos have gear warning systems. And what about the scanners, what were they doing?"

"Yes, they do, Jack. But this

one didn't work due to a faulty cannon plug. Remember, warning systems are secondary, people can't depend on backup systems to do their jobs for them. The scanners got involved by failing to properly clear the aircraft down for landing. The LZ was soft, and the crew knew it. The right scanner should have been looking at the gear as the helo settled. Soft LZ conditions dictate extra care. The IP was in command, but never checked actual gear position. So, what we evidently have here are problems in several areas—standardization, training, supervision, and crew coordination. But, you can throw all that stuff out and boil it down to one fact—if the crew had stuck to the book it wouldn't have happened. *That's why they wrote the damn thing!"*

"Hey, take it easy, I agree with you. But this is just one minor incident out of hundreds of MAC flights each week."

"I know, but that's not the only one. Listen to this one. One of our heavy airlifters takes off and reaches cruise altitude over the Pacific. They have the FSAS in long range cruise mode at FL 390. Autothrottles are also engaged. All of a sudden the pilot notices a drop in EPR, EGT, and fuel flow on all four engines. Evidently, this took him by surprise, and he asks the copilot, an IP by the way, 'Is this a joke?' The copilot says 'No.' Instead of analyzing the situation, checking all indications such as are the generators still on line, airspeed, autopilot still engaged, descent rate, etcetera, the pilot initiates an airstart on all four engines. Airspeed decreased all of 10 knots, and they descended 1,400 feet. They turned off course, made distress calls, and returned to base.

"What happened? The airplane encountered the center of Pacific high pressure aloft that resulted in an increase in total air temperature and a decrease in air density. This caused airspeed to increase and the FSAS commanded the autothrottles to retard to maintain long range cruise Mach number. Later tests confirmed this."

"Now wait a minute, Mac. Don't forget, we use that system too. I've seen something similar to that. You probably have too."

"Right. You just have to be aware of your configuration. The helo guys *thought* their gear was down, so it must have been. This crew forgot what the autothrottles *could* do and didn't recognize it when the system did what it was supposed to. Man, you just have to stay awake and aware.

"But wait, I have one more. This is what really got me started on this stuff today. I talked to a buddy who is an Associate Editor on *The MAC Flyer*. He was out in the system recently, and was a passenger on a mission flying across the Gulf. When he saw part of the Florida coast through the cargo compartment window, he decided to go up to the flight deck to see where they were. When he got up there, he found the pilots, feet on the foot rests, heads down, *reading paperback novels! AARGH!!!* I'd like to grab people like that by the lapels, shake them, and scream; *'What are you thinking about??'"*

"If you ever find them, let me know, Mac. I'll give you a hand."

Visual Illusions — and More

The eyes alone don't always have it.

By Maj. Thomas C. Weinzierl
Supervising Editor

An overseas fighter mishap provided some very interesting insights into what we'll call an "induced" visual illusion, which, when combined with other factors, holds valuable lessons for MAC pilots as well.

During the briefing, the flight lead provided his wingman (new to the theater) with night landing techniques which emphasized use of VASIs to prevent landing short. The worst weather forecast was 1,000 ft ceiling and 7,000 meters visibility. Published NOTAMs indicated active runway approach lighting system (ALS), high intensity runway lights (HIRLs), and opposite direction ILS weren't available. The Wing DO, ADO, airfield manager, and civil engineers inspected runway lighting. The DO received airborne evaluations of lighting on both runways by various aircraft in the

pattern. Based upon positive feedback from those pilots and his own inspection, the DO determined lighting was adequate for night flying on either runway. All lighting systems were operating except 1,400 ft of the ALS closest to the active runway threshold.

The mishap flight proceeded uneventfully until the first approach. The approach controller got confused sequencing the flight (a two-ship with Lead behind the mishap pilot) and was unable to provide PARs, so the flight split up for individually vectored approaches.

The mishap pilot received vectors to intercept the active runway's localizer at 13 miles and was cleared for an ILS approach. Weather was reported as 500-ft ceiling and 4,500 meters visibility in fog. Between 6-8 miles on final, the airplane's glide slope indicator went to the top of the ADI and stayed there with no ILS "OFF" flag visible. The pilot deemed the ILS glide slope unusable and transitioned to a localizer-only approach. He leveled his jet at his own pilot weather category of 500 ft AGL. At approximately 3 DME he saw the sequence flasher lights (SFLs) and the runway environment. Between 2.4 and 2.0 DME, (threshold is 3/10 of a mile short of the TACAN) he established a 2.5 degree descent using his HUD and began a concentrated search for the VASI lights. About 1.3 DME he unknowingly steepened his approach and held something in excess of 3 degrees until just prior to impacting a sequencing flasher light about 1,250 ft short of the threshold and 650 ft short of the overrun. The airplane struck several approach lights, one of which sheared off the right main gear. The mishap pilot began a go-around but, once over the runway, elected to land. Touchdown occurred about 1,500 ft down the runway. As the airplane slowed, the right external wing tank contacted the runway, causing the airplane to depart the right side of the runway. The pilot egressed uninjured.

How could a pilot do such a thing? Well, while not entirely blameless, he did have some help. The investigation board found that while the ALS and HIRLs were NOTAMed as not available, the HIRLs were operating, but about 20 percent of the lights were out. Again, the last 1,400 ft of the 3,000 ft ALS closest to the threshold were out. Also, during the evening but prior to the mishap, tower personnel failed to increase the step setting for the ALS and HIRLs, as required by regulation. Both lighting systems were set one step below required intensity.

Investigators discovered some revealing facts about airfield lighting. AFR 55-48, U.S. Standard Flight Inspection Manual, provides a detailed checklist for required VASI commissioning checks but doesn't provide similar detailed guidance for subsequent, routine airborne checks. The regulation also requires airfield lighting be evaluated from the air in conjunction with routine 180-day flight tests of other NAVAIDS. According to the flight check folks, this normally involves checking VASIs for coincidence with a precision approach and approach lights and HIRLs for light intensity. Those checks don't adequately evaluate threshold light intensity or VASI light discernibility during night operations and don't adequately document actual condition of the airfield lighting evaluated.

Investigators evaluated the airfield's lighting system, from a helicopter, on three settings:

- As it was the night of the mishap.
- On the correct setting for the night of the mishap.
- On the correct setting for the night of the mishap with the full ALS operating.

They found the VASIs extremely difficult to acquire and use at all settings, even while hovering one-half mile from the threshold. Red and white indications didn't contrast and, at times, all lights appeared yellow. The farthest VASIs are in line with approach end BAK 9 cable lights. Runway remaining

lights are just outside the VASIs. Their brightness and proximity to the VASIs made them difficult to use.

With lights set as they were when the mishap occurred, it was difficult to identify the threshold. A "black hole" approximately 1,500-ft-long existed in the unlit area between the last sequenced flasher light and the first operational HIRL located about 475 ft past the threshold. Threshold lights appeared very dim and did not provide adequate threshold identification. Brightness of both the SFLs and runway end identifier lights (REILs) made the threshold more difficult to acquire. In addition, it was extemely difficult to identify where the sequence flasher lights ended.

". . . while not entirely blameless, he did have some help!"

When light settings were increased to required settings (with 1,400 ft of the ALS still inoperative) it was slightly better, but still difficult to identify the runway threshold due to the same black hole effect, dim threshold lights, and strobe lights. It was much easier to identify the runway threshold when the entire ALS was operating, and the ALS and HIRLs were on the correct setting. Brightness of the ALS tended to negate problems caused by strobes. While the threshold lights still didn't stand out very well, the full ALS significantly aided in identifying the runway threshold out to approximately 2 DME.

Investigators made the following observations: VASIs were barely discernible and glide path indications were inconsistent between left and right side VASI bars. On one run, VASIs were barely discernible at 3 DME. The left side wasn't discernible until 1 DME. Right side colors weren't discernible until 2 DME. On all three runs, VASIs appeared embedded in the barrier moons and runway distance markers. Threshold lights were discernible but not strong enough, even with the HIRLs on Step 5. On any one step setting, individual light intensities varied.

According to the mishap pilot, he was unable to acquire the VASIs. In addition, he was unable to identify the runway threshold with existing lighting. A survey of pilots who had flown the same night revealed that most could not acquire the VASIs and used lighting other than the threshold lights (taxiway or barrier lighting) to identify the threshold or an aim point.

As with most recents mishaps, human factors contributed significantly. Primary human factors associated with this mishap were the visual cues available and preparation of the mishap pilot to cope with this situation. The mishap pilot had accomplished 5 hours of his 6.3 hours night flying in his jet in CONUS. He had only flown one night sortie at the mishap base, a runway with a very different visual environment than his most recent (i.e. a wide and long CONUS runway) experience. Visual references involved were unreliable for three main reasons:

- A dramatic geometric perspective illusion based on runway size difference which, in the absence of daylight cues, caused the pilot to believe he was higher and farther from the runway than he was. For example, at 2,000 ft from the threshold, the mishap pilot would perceive he was about 90 ft higher on the mishap runway than at his most recent CONUS location.
- The unanticipated absence of 1,400 ft of approach lights nearest the threshold lights and VASIs. This tended to lead his eyes (and likely his flight path) to a point short of the runway threshold but beyond the last sequence flasher lights where there were no lights at all.
- VASI intensity and location didn't permit easy visualization beyond the sequence flasher nor, had they been acquired, would they have provided reliable glide slope information. However, it is true that these visual problems likely could have been overcome by adequate preparation of the mishap pilot. The training and evaluation of the pilot at UPT and RTU involved only demonstrating ability at those locations. The board believed that preparation had been adequate but didn't sufficiently prepare the average new pilot for challenges of the very different environment he would face in his overseas location.

The mishap pilot's testimony indicated he dropped all cues except visual references from his crosscheck. This included not referencing the VDP when descending out of the MDA; not setting the initial aim point at or beyond the threshold, probably because he couldn't accurately determine the threshold based on available lighting; not monitoring touchdown point and glide path by referencing all other available aids, most significantly, altitude in relation to DME; and not executing a go-around when he couldn't acquire the VASIs.

But, not to worry. MAC pilots aren't susceptible to the same errors.

Are they?

Flying-Hour Milestones

15,000

185 TAS
CMSgt. Samuel H. Green

10,000

187 TAS
MSgt. Joseph C. Cordova

7,500

94 TAW
Lt Col. Nelson D. Powell, Jr.

185 TAS
SMSgt. Danny M. Platt

437 MAW
Col. George D. Burgess

5,000

67 SOS
MSgt. Donovan L. Wilder
TSgt. Benny J. Damron

130 TAS
MSgt. David R. Strickland

2,500

6 MAS
Col. Ernest H. Jones
Lt. Col. Daniel P. Bangs
Lt. Col. Roy H. Bass, Jr.
Lt. Col. Joseph P. Conant
Lt. Col. Barry F. Creighton
Lt. Col. Stephen J. Gaertner
Lt. Col. Richard W. Jenkins
Lt. Col. F. Randall Starbuck
Maj. Rudy W. Becker
Maj. Ned F. Cash
Maj. Donald W. James
Maj. Fred M. Lucero
Maj. Frank L. Machesky
Maj. John A. Pasqual
Maj. Robert G. Simmons, Jr.
Maj. Richard H. Weeks, II.
Capt. Lowell E. Ahola
Capt. Edward J. Callaghan
Capt. Sherman A. Fray
Capt. David L. Fox
Capt. Harriet A. Griffith
Capt. Gary L. Hart
Capt. Robert V. Manaier
Capt. John E. Nelson
Capt. Martin D. Potash, Jr.
Capt. Robert J. Richard, Jr.
Capt. Paul R. Roberts, III.
Capt. David A. Siler
Capt. Paul A. Smith
Capt. Patrick K. Stamper
Capt. Vincent P. Tomasini
SMSgt. Daniel W. Good
SMSgt. David K. Wilson
MSgt. Edward P. Barnes
MSgt. Rocco Bollotta
MSgt. Charlie E. Costello, Jr.
MSgt. Joseph Giacobello, Jr.
MSgt. Hagob Kassabian
MSgt. John C. Monahan
MSgt. Michael J. Polhemus
MSgt. James G. Welch
MSgt. Anne Wright
MSgt. Czeslaw L. Zak
TSgt. William R. Boutchia, III.
TSgt. Alfred L. Bridges
TSgt. Robert B. Burnett
TSgt. Donald G. Emig
TSgt. Kenneth D. Gould
TSgt. Timothy J. Gould
TSgt. John W. Gordon
TSgt. James A. Neylon, Jr.
TSgt. Paul A. Stowell
TSgt. Carl E. Thornton
SSgt. Joe D. Blanton
SSgt. Brian M. Boardman
SSgt. Conrad S. Braun
SSgt. Kent A. Brown
SSgt. David D. Carrington
SSgt. Jeffrey L. Daniel
SSgt. Arthur R. Demers
SSgt. James W. Day, Jr.
SSgt. Ricky D. Fisher
SSgt. Wayne E. Forrer
SSgt. Mark E. French
SSgt. Steven Goldberg
SSgt. Jame J. Halstead
SSgt. Charles A. Hiett
SSgt. Paul G. Hiller
SSgt. Bobby R. Hudson, Jr.
SSgt. Milton M. Kish, Jr.
SSgt. Jeffery M. Leonard
SSgt. John C. Matthews, Jr.
SSgt. Leroy A. McKenzie
SSgt. Eugene R. Meany
SSgt. Alonzo J. Miller, Jr.
SSgt. Darryl D. Pearson
SSgt. Dennis M. Petry
SSgt. Charles E. Royer, IV.
SSgt. Thomas J. Thompson
SSgt. Kevin P. Hauschka
Sgt. Kevin J. Fernandez
Sgt. Ronald W. Lindner, Jr.
Sgt. Wayne F. Mallaber
Sgt. Craig L. Terry

14 MAS
Col. Brooke P. Bailey
Lt. Col. Steven A. Roser
Maj. Joseph B. Niemeyer
Maj. Martin W. Westerfield
Capt. Wendell E. Burden
Capt. Russell S. Clark
Capt. Robert M. Clemens
Capt. Phillip C. Hannah
Capt. Michael A. Wicknick
SSgt. David L. McIntyre
SSgt. Tommy D. Thompson
Sgt. Brigham T. Gasu

17 MAS
Capt. Donald L. Jackson
1st Lt. Randolph M. Strepek
SSgt. Deborah E. Main

18 MAS
Lt. Col. Ray M. Cole, Jr.
Lt. Col. Norman Schaule
Lt. Col. Phillip D. Spencer
Lt. Col. Donald H. Stallings
Maj. Richard T. Carson
Maj. Joseph K. Seranseli
Maj. John E. Tamkun
Maj. Daniel C. Todd
Maj. Chester J. Trosky, Jr.
Capt. Grant M. Charles
Capt. John W. Glispin, Jr.
Capt. Ray E. Heal
Capt. John D. Howard
Capt. William G. Luke
Capt. James Martino
Capt. Russel S. Miller
Capt. Pat Quinn
Capt. Michael D. Thompson
CMSgt. Harry W. Mattox
SMSgt. Jeffrey R. Kersey, II.
MSgt. Ferrel M. Caskey
MSgt. Bryan P. Dobrowolski
MSgt. Michael R. Lamere
MSgt. David C. Latham
MSgt. Lynn G. Moyer
MSgt. Gary T. Richardson
MSgt. Frank Tinga
MSgt. Harry B. Wallis
TSgt. Richard K. Bauman
TSgt. Wayne M. Brincat
TSgt. Oren M. Carrol
TSgt. Keith A. Colbath
TSgt. Thomas W. Gates
TSgt. Frederico A. Gonzalez
TSgt. Jerome C. Hansom
TSgt. John P. Hayden
TSgt. Peter M. Jaskot
TSgt. Vernon C. Robinson, Jr.
TSgt. Glen T. Ross
TSgt. Jerry L. Waldeck
TSgt. Jepeth D. White, Sr.
SSgt. John H. Aldershoff
SSgt. Phillip G. Cook
SSgt. Thomas P. Corrar
SSgt. Michael B. Decker
SSgt. Bruce W. Eddy
SSgt. Terry Foley
SSgt. Edwin A. Gajate
SSgt. Michael J. Johnson
SSgt. Barry A. Lennon
SSgt. Robert F. Lowery
SSgt. Randall A. Morris
SSgt. Dennis G. Nerolich
SSgt. Alfonso Newton
SSgt. Matthew J. O'Hara
SSgt. Allen B. Pearson
SSgt. John F. Popp
SSgt. Nathan D. Sheets
SSgt. Ernest D. Vera
SSgt. Robert S. Viguers, III.
SSgt. Charles E. Walker
SSgt. Timothy D. Widner
SSgt. Michael C. Williamson
SSgt. Michael J. Zavisho
Sgt. Dennis K. Hennessy
Sgt. Bradford A. Huggins
Sgt. Thaddeus R. Nitkiewicz

20 SOS
Capt. Stephen M. Jones
SMSgt. Larry J. Hunter
MSgt. Ronald J. Dorazio
Capt. Louis A. Caporicci
Capt. Alan C. Prokosch
Capt. Marshall B. Webb
Capt. Jeffrey D. White
TSgt. Clark F. Dawson
TSgt. Martin R. Holtsberg
TSgt. David Morales

21 SOS
Lt. Col. Stephen R. Connelly
Maj. Frank A. Gray
Maj. Eric J. Nickerson
TSgt. Nelson Neal
Capt. William L. Bassett
Capt. Brendan G. Clare
Capt. Steven F. Dreyer
Capt. David N. Freeman
Capt. Richard D. Headrick
Capt. Thomas E. Hull
Capt. Karl H. P. Kaser

Capt. Keith A. Kollarik
Capt. Robert E. Tillema
TSgt. Dan M. Howard
SSgt. Michael W. Harte
SSgt. Timothy R. Hill
SSgt. Dana L. Sherif
Sgt. Kevin P. Carver
Sgt. Ronald D. Wheeler

30 MAS

Col. Frank M. Pearce
Lt. Col. Dennis R. Weaver
Lt. Col. Jon R. Wesley, II.
Maj. Dennis A. Balkham
Maj. David E. Benton
Maj. John Bruns, Jr.
Maj. Jeffery E. Frey
Maj. Richard W. Holden
Maj. Russel H. Loughlin
Maj. Robert P. McAdams
Maj. Michael W. McCoy
Maj. John M. McTammy
Maj. Gerald L. Minnich
Maj. Kindall W. Moore
Maj. Quentin L. Peterson
Maj. Thomas G. Williams
Maj. Israel S. Yarcham
Capt. Philip A. Angeron
Capt. Max M. Hart
Capt. Walter W. Taylor, Jr.
SMSgt. Robert C. Bloom, Jr.
SMSgt. John B. Rigdon
MSgt. Steven R. Angell
MSgt. Brian S. Carroll
MSgt. Donald L. Craft
MSgt. Charles J. Evanich
MSgt. Charles P. Hayes
MSgt. Richard T. Helton
MSgt. David Joyce
MSgt. Keith A. Lisby
MSgt. James M. Postle
MSgt. Thomas Schuhl
MSgt. Albert J. Walcek
MSgt. Berry L. Watts
MSgt. Floyd D. White, Jr.
MSgt. David E. Williams
TSgt. Robert E. Baker
TSgt. David J. Brown, Jr.
TSgt. Thomas Carey
TSgt. Joe N. Daniels
TSgt. Ernest R. Goebe
TSgt. John W. Gordon
TSgt. John J. Hranek
TSgt. Richar A. Hudes
TSgt. Wayne F. Marter
TSgt. Edward F. McConahy
TSgt. Michael L. Piasecki
TSgt. Joseph A. Scully
TSgt. Michael D. Smith
TSgt. John M. Talbert
TSgt. Carey Thomas
SSgt. Timothy P. Barr
SSgt. Alfred Breese
SSgt. Willard M. Coleman
SSgt. James J. Deffely
SSgt. Richard D. Doerr
SSgt. Michael P. Donnelly
SSgt. Thomas A. Elic
SSgt. Stephen W. Harmon
SSgt. David L. Harris
SSgt. William Henriqez
SSgt. Michael R. Hutchinson
SSgt. Thomas A. Kenny
SSgt. David S. Kiczales
SSgt. Robert J. Kowalenski
SSgt. Gerald S. Larsen
SSgt. Frederick W. Martin
SSgt. Scott J. Peltier
SSgt. Dennis P. Oehmsen
SSgt. Raymond F. Pleva
SSgt. Marvin C. Reynolds
SSgt. Lawrence S. Spring
SSgt. Christopher Wigfall
SSgt. Daniel Wiggers
Sgt. Shelton T. Belsches, Jr.
Sgt. Daniel B. Eastman
Sgt. Stephen J. Horvat
Sgt. Steven W. Jewett
Sgt. Glen A. Shaide
Sgt. Kirk D. Sweger

39 SOW

Col. Robert A. Rossi
Capt. Derek P. Wheeler

39 TAS

Col. Bernard F. Malcuit
Col. Daniel E. Sowada
Lt. Col. Charles A. Blake
Lt. Col. Jack R. Holbein, Jr.
Lt. Col. William J. O'Meara
Lt. Col. Thomas P. Quance
Lt. Col. Dennis A. Siltanen
Lt. Col. Ross P. Van Lerberghe
Maj. Richard S. Cheney
Maj. George M. James
Maj. David J. Johnson
Maj. Charles Lapusheski
Maj. Robert K. Miller
Maj. Thomas H. Saunders, Jr.
Maj. Stuart E. Wilson
Capt. William W. Bradley
Capt. Henry D. Brinkman
Capt. David M. Brockett
Capt. Michael C. Hathaway
Capt. William K. Hathaway
Capt. William K. Johnson
Capt. Timothy W. Purcell
Capt. Larry K. Rhodes
Capt. Steven M. Rice
Capt. Kirt C. Sederstrom
Capt. Richard R. Stevens
Capt. Matthew J. Trucco
Capt. Richard B. Turner
Capt. Thomas A. Wawrynovic
Capt. Robert M. Whiddon
CMSgt. Wendel R. Flannery
SMSgt. Joseph P. Szall
MSgt. Rudolph Blazek
MSgt. Adrian M. Burrows
MSgt. William F. Dunlap
MSgt. Daniel L. Peacher
MSgt. Edward J. Politza
MSgt. David L. Tiemann
MSgt. William H. Trent
MSgt. Eric K. Truesdale
TSgt. Gary L. Burgess
TSgt. Dennis A. Doetsch
TSgt. Danny M. Gantt
TSgt. Harold O. Geiser
TSgt. Edgardo F. Jose
TSgt. William A. Knight
TSgt. Herbert R. Lawson
TSgt. Eric W. Lichtenberg
TSgt. Donald Q. Ralston
TSgt. James R. Schmidt
TSgt. Karl R. Wade
TSgt. John M. Wilkerson
SSgt. Kenneth F. Doiron
SSgt. Daniel P. Hindes
SSgt. Michael A. Sawyer
SSgt. William T. Skaggs
SSgt. Buford L. Thompson
SSgt. Darren R. Trexler
SSgt. John F. Wells

52 MAS

Capt. Wayne F. Collins
Capt. Junior L. Inglis
MSgt. Cris King
MSgt. Daniel J. Leist
MSgt. Robert E. Wright, Jr.
TSgt. Oscar J. Churchill
TSgt. Ronald D. Grubbs
TSgt. Vance C. Hoyle
TSgt. Shailes McWan
TSgt. John A. Reinhart
SSgt. Raymond E. Assanti
SSgt. Anthony T. Jewell
SSgt. Carlos A. Moran
SSgt. Peter L. Osterfeld
SSgt. James L. Riddle
SSgt. Sidney B. Spear
SSgt. Bruce I. Taft
SSgt. Roger H. Thomas
Sgt. Ronald A. Neeham

56 ARRS

Capt. Grant Tarpinian
Capt. Bruce Oyston
Capt. Gene Vey
TSgt. Robert L. Lynch, Jr.
SSgt. Aubrey Wiley

67 ARRS

Lt. Col. Patrick H. Crotty
Lt. Col. William E. Goodwin
Maj. Stephen A. Eells
Maj. Robert F. Paling
Maj. Kenneth A. Stafford
Maj. Robert C. Stewart
Maj. Steven W. Weiss
Capt. Lewis A. Bunch, III.
Capt. Arthur J. Cook
Capt. Robert D. Dudley
Capt. Jon M. Stolicny
Capt. Boyd L. Thornburg
TSgt. Lawrence J. Bush
TSgt. Gary A. Hutchison
TSgt. John O. Thomas
TSgt. Richard W. Todd
SSgt. Steven E. Brown
SSgt. Willie W. Curry, Jr.
SSgt. George M. Engle
SSgt. Ralph T. Lawrence

172 MAG

TSgt. Randy J. Robinson
TSgt. Dale W. Walker

185 TAS

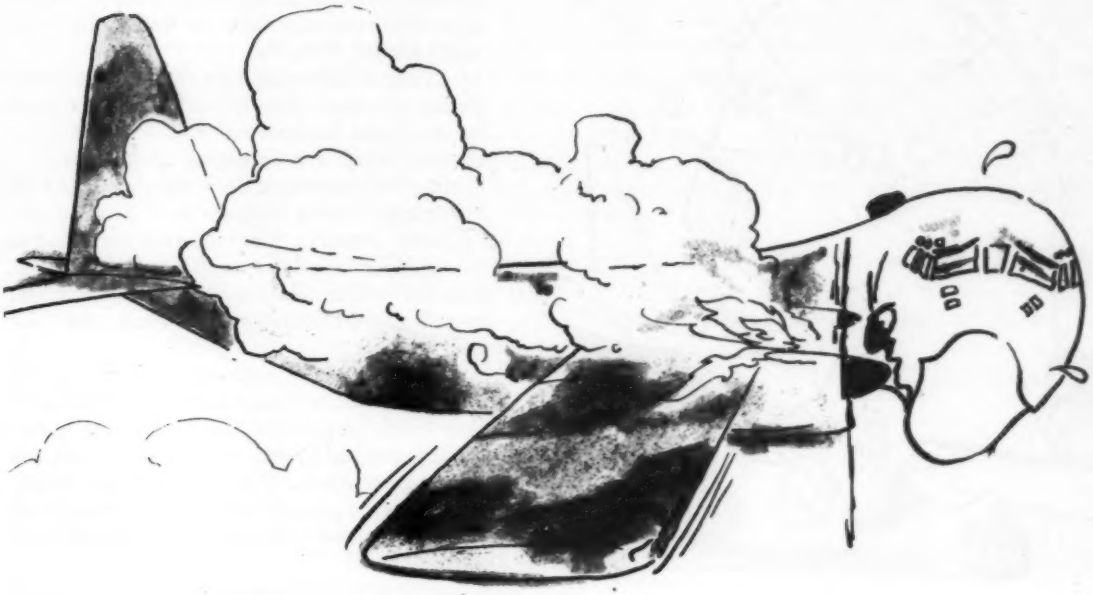
Maj. Charles P. Lang, Jr.
MSgt. Robert L. Weaver
TSgt. Ronald H. Hays

317 TAW

Lt. Col. Robert W. Allen, Jr.
Lt Col. William F. Brewer
Lt. Col. William H. Krechowski
Lt. Col. Michael E. Phee
Lt. Col. Robert A. Skolasky
Lt. Col. Jon M. Swanson
Lt. Col. Norbert C. Wagner
Maj. John T. Cassil
Maj. Edward A. Gallagher
Maj. Keith W. Johnston
Maj. Richard J. Morra, II.
Maj. John C. Pemberton
Maj. William J. Willis
Capt. Perry W. Brown
Capt. Stephen W. Byrnes
Capt. Robert B. Drinkwater
Capt. Robert H. Obermeier
Capt. Jon K. Reynolds
Capt. Douglas M. Upton
Capt. Daniel H. Williams
SMSgt. Charles A. Elburn, Jr.
MSgt. Tommy R. Cartier
MSgt. Howard J. Gulick
MSgt. Ray Slaughter
TSgt. John C. Atkinson
TSgt. James E. Carnegie
TSgt. Gary M. Colvin
TSgt. Michael C. Hushion
TSgt. Bernard F. Restifo
TSgt. James A. Seagle
TSgt. Walter T. Skeen
SSgt. Steven P. Austin
SSgt. Jimmy Davis
SSgt. Carlos A. Rivas
SSgt. Glen C. Tiffany
SSgt. Richard L. Townsend
SSgt. Willis R. Whitney
SSgt. Michael O. Woodruff
SSgt. Robert G. Zills

Ranks and units are those at time of award. ★

QUICKSTOPPERS



THIS IS NOT A DRILL—REPEAT—THIS IS NOT A DRILL

The Herc crew was going to fly your classic "local pilot pro." Start, taxi, and runup went smoothly enough to make you think it'd be a goer. End of the good news; immediately after rotation, Number 4 Nacelle Overheat light illuminated—this ain't simulated!

Less than 3 seconds later (count 'em—three), the Number 4 Fire light illuminated—accompanied by that dreaded horn. During the boldface execution, the loadmaster reported flames escaping from Number 4's engine cowlings, and the crew discharged the first fire bottle.

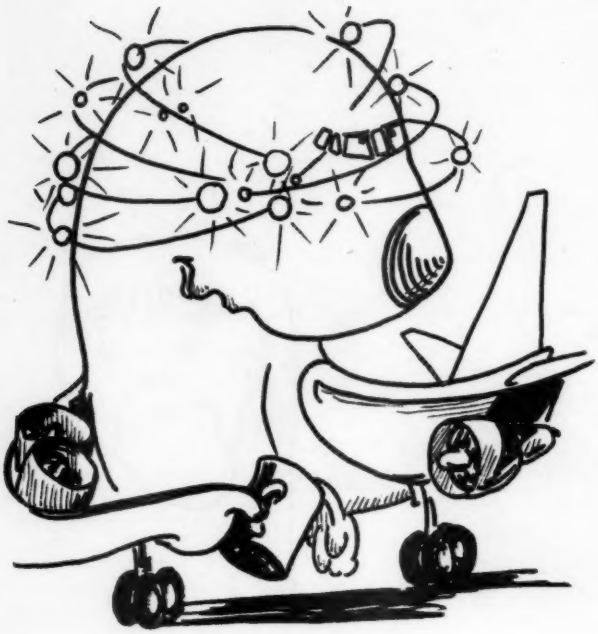
Maintaining aircraft control (step ONE) the pilot made an immediate course reversal and tower cleared *Hot Stuff One* for an immediate opposite direction landing. The fire light remained illuminated though, and the loadmaster still saw flames, so the second bottle was fired. The light was still on! The pilot stopped on the runway, and the crew performed an expeditious emergency get away.

Here's how it happened: during engine start, Number 4 starter failed (for unknown reasons) to disengage. There were no abnormal flightdeck indications. With the starter engaged the whole time, the exducer became overstressed (also perhaps a common condition among flight engineers during local pro sorties). The pin holding the exducer to the turbine failed and the exducer was "shot" out of the housing, severing a hydraulic line and several wires, and damaging the generator shroud and engine panels. The ensuing fire finished the job.

(Editor's Comments: To the crew—BRAVO!!!!)

QUICKSTOPPERS

COFFEE INGESTION INDIGESTION



Foreign object ingestion into turbine engines is a familiar hazard. As cockpits become more electronic aircrews are finding beverage spills serious hazards.

A cup of coffee spilled on the 747's pedestal during approach. Results—a background noise in the flight interphone; test weather radar system Number 2 becoming unserviceable; a steady "88" shown on CDV Number 3; and the interphone listen switch not holding the "pushed" position. The following parts had to be replaced: copilot's audio selector panel, weather radar Number 2, weather radar operating panel, wave guide switch, and CDV INS Number 3.

That day, the aircraft was dispatched for a flight and, although preflight checks were okay, both radar sets failed en route. After landing the radar sets were changed but the problem remained. The trouble was finally traced to arcing spots at the radar set pedestal plugs—the same ones previously flooded with coffee.

Although most people are taught not to cry over spilled milk, the cost of this coffee spill came to roughly $300,000!

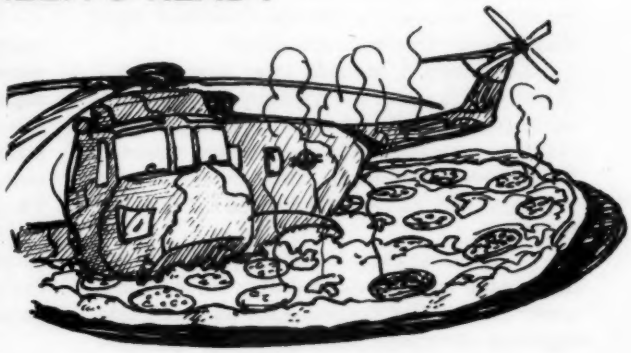
(Courtesy *Flight Safety Digest*)

YOUR PIZZA'S READY

There's more than one way to warm an HH-3E cockpit as this *flaming* helicopter crew found out. They were practicing formation remote site landings, and just after takeoff the crew smelled smoke and saw fire. Its origin was the "pizza" rack behind the copilot.

As smoke filled the cockpit, the whirly crew did what us starch wingers cannot, and landed post haste. After shutdown and emergency evacuation, the obnoxious source was discovered to be the HF radio (spelled Hot Fire).

Having disconnected the *burning memory*, the crew cranked and flew it home.



After Deadlines

EAGLE-EYED READERS STRIKE AGAIN--Several sharp-eyed readers called and pointed out an error in the March *TMF Instrument Quiz*. The correct answer to Question 11 should have been "*d*." When in radar contact (following radar vectors), and you've received clearance for a *published* approach, you are not required to make a radio call when vacating an *assigned* altitude for a published altitude, as you would when vacating a previously assigned altitude for a newly assigned altitude.

KUDOS TO A 773D TACTICAL AIRLIFT SQUADRON CREW--for receiving the USAF Well Done Award. Capt. Jeffrey S. Spencer, Capt. David R. Heikin, 1st Lt. Robert J. Siani, Jr; SSgt Roy D. Dowdy, Sgt. Vincent W. Schuster, Jr; A1C F. R. Bundy, and A1C Howard W. Jackson earned this recognition for their actions and professionalism after experiencing a near-catastrophic flight control malfunction while crossing the Atlantic.

MAC RESERVE HELICOPTER CRASHES--An Air Force Reserve CH-3 "Jolly Green Green Giant" helicopter crashed in the Arizona desert 12 March, killing 4 Reservists and 11 Army Green Berets. There were no survivors.

MAC HELICOPTER CRASHES--An HH-3 flying out of Kadena AB, Japan, crashed in the Pacific Ocean 14 March, killing three crewmembers. There were two survivors.

HISTORY MAKER MSGT. JERRY C. LANGSDTON--an instructor flight engineer in the 56th Military Airlift Squadron, became the first person to log 1,000 hours flying time in the C-5B Galaxy.

Regulations For Operation of Aircraft

Commencing January 1920

1. Don't take the machine into the air unless you are satisfied it will fly.
2. Never leave the ground with the motor leaking.
3. Don't turn sharply when taxiing. Instead of turning sharp, have someone lift the tail around.
4. In taking off, look at the ground and the air.
5. Never get out of a machine with the motor running until the pilot relieving you can reach the engine controls.
6. Pilot should carry hankies in a handy position to wipe off goggles.
7. Riding on the steps, wings, or tail of a machine is prohibited.
8. In case the engine fails on takeoff, land straight ahead regardless of obstacles.
9. No machine must taxi faster than a man can walk.
10. Never run motor so that blast will blow on other machines.
11. Learn to gauge altitude, especially on landing.
12. If you see another machine near you, get out of the way.
13. No two cadets should ever ride together in the same machine.
14. Do not trust altitude instruments.
15. Before you begin a landing glide, see that no machines are under you.
16. Hedge-hopping will not be tolerated.
17. No spins on back or tail slides will be indulged in as they unnecessarily strain the machines.
18. If flying against the wind and you wish to fly with the wind, don't make a sharp turn near the ground. You may crash.
19. Motors have been known to stop during a long glide. If pilot wishes to use motor for landing, he should open throttle.
20. Don't attempt to force machine onto ground with more than flying speed. The result is bouncing and ricocheting.
21. Pilots will not wear spurs while flying.
22. Do not use aeronautical gasoline in cars or motorcycles.
23. You must not take off or land closer than 50 feet to the hangar.
24. Never take a machine into the air until you are familiar with its controls and instruments.
25. If an emergency occurs while flying, land as soon as possible.